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The Architecture of the Lake Dwellings of Europe.

IT is proposed in this essay to give a rapid survey of the facts already known in regard to this remarkable class of building works, mostly of remote antiquity, which until comparatively recent times were altogether unknown; to trace their extension into many of the countries of Europe, indicate some of the modes of construction adopted, with notes upon some of the works discovered on the various sites.

It is now almost an old story, which need only be glanced at, to refer to the winter of the years 1853-4, when a very great drought and continued cold caused an unusual event in the Swiss lakes. Not only the rivers, but the lakes, sank much below the oldest recorded level, and, in consequence, much of the shores that had been covered with water was left high and dry. The inhabitants took advantage of this state of things to reclaim portions of the land, and at Ober Meilen, on the Lake of Zurich, the workmen were surprised to find that the land they were reclaiming was covered by a mass of wooden piles firmly driven into the bed of the lake, but so rotten as to indicate very great age. The piles commenced about 300 paces from the existing shore, and extended parallel to the bend of the lake about 500 paces further into the water until it became suddenly deep. They might be counted by thousands in the portion operated upon. They were driven below and covered by an upper bed 2 ft. thick, consisting of yellowish mud, such as is deposited all over the surface of the lake where not much exposed to the action of the waves. Beneath this is a bed of sandy loam from 2 ft. to 2 ft. 6 in. in thickness, black with organic matter, called the "relic bed" by Swiss antiquaries, and in this the heads of the piles and many antiquities were found. Below this was a bed of clean loam, of great thickness, into which the piles were driven, but nothing was found. The piles are of oak, beech, fir, and birch, from 4 in. to 6 in. thick. Some are whole trunks, but the majority of the sizes named consist of split stems, the ends being either pointed by fire, or in some cases roughly hacked into form by stone implements. Only a few bronze articles were found, the others consisting of stone celts, chisels of varying size, form and material, several being of stone foreign to Switzerland, some of nephrite, and some few articles of flint being also met with, this material being rare in Switzerland. This, the first site met with, proved to be one of the oldest, since it belongs to the age of stone, with evidences of some, but not much, later occupation.

The description given is more or less typical of numberless other discoveries that were made in an incredibly short space of time, in many other of the Swiss lakes, varying only in details of construction, extent, and in the articles found in the "relic beds," which latter have been invariably found beneath the ordinary and most recent deposit. Discovery followed discovery: an eager band of investigators emulated one another in making search, either by excavations wherever possible, or by dredging the lake bottoms, and all were well rewarded.

A map of any Swiss lake, on which the discoveries are recorded, affords ample subject for comment, for the lake dwellings prove to be remarkable in respect to their numbers, indicating the existence of a large population. Almost all along the lake of Neuchatel, the sites which have been found up to the present are at distances averaging about an English mile apart, or fifty sites in all. On that of Bionne four sites are met with within a single mile. On the shores of the little lake of Morat fifteen sites are indicated in Keller's "Lake Dwellings," in a shore-line of about eleven miles. The lake of Geneva is dotted with a remarkable number of sites from the capital quite up to and past Lausanne. These sites are in some cases just opposite to modern villages, suggestive of what is probably a fact,—that, when the lake dwellings were finally given up, their inhabitants settled on the mainland opposite to their old homes.

The discoveries in Switzerland were not likely to remain for long isolated. Investigators in other countries,—Italy, Holland, Germany, France, Great Britain, Austria, and elsewhere,—speedily had discoveries to record; and what seemed at first but a peculiar mode of building of an unknown people, now has spread to the greatest part of Europe, revealing to us an entirely new and unexpected field of study. Since these structures afford, perhaps, the oldest system of building construction at present known, the system claims attention, and the more so since the traditions of early architecture all refer to a time when the grandest features of Classic art had their prototypes in structures of wood. But the buildings of Switzerland are, doubtless, of earlier date and of simpler design than the earliest and most incipient form of the Doric order in its first wooden conception.

Investigators of the lake dwellings soon became aware that various modes of building were adopted, and these will now be referred to. The simplest type consists of a platform supported on piles driven into the shallow sides of the lakes, generally of rectangular form, connexion with the shore being obtained by means of a narrow causeway of piles supporting a timber gangway. On the platform huts were erected, forming the habitations of the tribe or settlement, together with enclosures for cattle. A large hearth was placed in the centre of each hut, bedded upon a layer of clay to prevent the timbers of the platform from becoming ignited, and in some instances there are indications of long occupation, as is evidenced by there being one hearth above an older one at a higher and more recent level. The flowing waters of the lakes passed freely between the piles, and trap-doors in the platforms afforded a ready means of disposal for the refuse of the settlement into the water. By this means a vast amount of *débris*, broken pottery, worked bone, and other articles numberless in quantity have been deposited, all of which help to form the "relic bed" which is met with on the site of each settlement. The piles are found, in most cases, singly, in others close together, generally placed with a certain amount of regularity, in parallel rows, but sometimes in great confusion of position. The points show very distinctly the marks of the

implements with which they have been cut, and distinction can be made as to whether with flint, by fire, with bronze, or, in the late examples, with iron hatchets. The piles are formed close to the shore in the earliest examples, but the revolution caused by the introduction of bronze is at once marked by the piles being longer, and driven into deeper water. In some instances a settlement of the Stone Age has been found, extended in this way into deeper water; in other instances, fresh formations are found. The piles being cut to a level, the platforms were then laid above them, the beams of support being fastened to them by pins or by mortises, central hollows, or notches. The floors were formed by unbarked stems of trees, in some cases in two layers, and, in one of the Italian examples, of rough split boards. The floor was then covered with clay and gravel firmly pounded down into position; and in some of the Italian examples, which resemble in other respects those of Switzerland very exactly, there is a layer of large pebbles.

In a few cases, the outer line of piles had an upright enclosure of wattles or hurdles above water-line, in order, apparently, to break the force of the waves from the piles. While this advantage would be secured, it would have to be at the risk of the retention of the decaying mass of deposit thrown in from above, and which would have been better washed away.

Another mode of construction of the platforms was for a mass of earth and stones to be brought from the land and thrown into the water, as the site of the intended settlement. By this means a certain amount of earth was deposited to form a mound beneath the water, into which the piles were driven, stones being afterwards deposited between the piles to steady them and keep them better in position. This arrangement is far from uncommon, especially in certain of the Swiss laks, and is known to antiquaries as a "Steinberg." In some examples the "Steinberg" has been brought to the surface, and at Nidau there is evidence of its having been occupied by the Romans. This site has been known for centuries, but the mass of ancient pile work beneath the later deposits has only been observed in the recent years of these discoveries.

While the formation of platforms upon piles has existed from the earliest beginnings quite to the Iron Age, with but little alteration, except in better workmanship, another mode of construction has been noticed in many instances. The platform is carried on a solid mass of sticks, small trees, stems, and such like, in fascines piled together in the water of the lakes, and kept in position by a few piles driven here and there to steady the mass. When it was sufficiently consolidated the platform was laid. This system is found mostly in the smaller lakes, but a high antiquity has been assigned to them which is sufficiently attested by the nature of the articles found.

It is far from improbable that this system is the older of the two, and certainly its simplicity would be likely to commend itself to an early people rather than the elaborate system of felling trees by means of flint implements, with all the labour of sharpening them, driving them into position in the waters of the lake, together with the framework of the carpentry platforms.

Sufficient attention has hardly yet been given by Swiss antiquaries to the difference between the systems named in regard to which is the earlier of the two, but a study of the subject, and of the articles found, can hardly leave a reasonable doubt that the formation of solid platforms of twigs and boughs, readily carried and deposited into position, was the earlier of the two. The insertion of a few guiding piles would readily enough be called for as a necessity, and this would lead in process of time to their entire use for the supporting of the platforms, for the advantage of obtaining a ready output for deposits.

Of the construction of the Dutch terpen, and the crannoges of Ireland and Scotland, mention will be made later.

The dwellings above the platforms were formed of small piles, and the framework filled in with branches, and wattle-covered with plaster inside and out. This is no mere matter of conjecture, for in several instances, quantities of the plastering have been found in the submerged mass of *debris*, with the marks of the wattles remaining. Fire has frequently caused the destruction of the settlements, and in such cases the whole mass of the burnt material is found where it fell. Nor were the surfaces left undecorated, if we may judge by the fact that in one of the sites met with on the Lake Bourget portions were found ornamented with incised lines and concentric circles, while on others the circles, arranged in a row, were filled in with the Fylfot cross. But this site is of late date. At Windisch, the clay coating was seen by the late Dr. Keller to be coloured white and red.

The covering of the huts was of thatch, various portions having been found; white moss was often used to stop the inequalities of walls and roofs. The huts were possibly circular in form in some few instances, but, apparently, for the most part rectangular, traces showing the sizes of the apartments having been met with in many places, in Switzerland and Italy especially. At Schussennied a settlement has been found, abandoned probably by its occupants on account of its being overgrown by peat. It is, at least, completely so overgrown now, and deep beneath it. One of the huts has been excavated, and found to have been about 33 ft. long and 23 ft. wide, divided into two inequal chambers. Other sites have produced indications of buildings of very similar size. In others, a sort of skirting-board is found on the platforms marking the sites of huts. In some places it is evident that they must have stood very close together, with compartments for cattle,—doubtless for security of keeping.

Safety from attack, with convenience for fishing, &c., appears to have prompted this singular and laborious mode of construction, although Switzerland did not possess, even at a remote period, wild animals of great ferocity, and foreign foes might have turned these timber dwellings speedily to ashes. Although many have suffered from conflagration, there is but little or no appearance that this was the work of an enemy. No traces of surprise and massacre, at least, are to be met with, except in the settlement, of late date, at La Tène. The general absence of human remains points forcibly to the peaceful existence of the inhabitants through a very lengthened period. But that they did actually indulge in warfare is apparent from the mass of offensive and defensive weapons which abound in all the sites, early as well as late; while at Estavayer something decidedly like a bronze arrow-head, with a groove for poison, has been found. The lake of Bionne and some other places have produced cups formed out of human skulls,—most probably those of enemies slain in battle.

It could hardly be expected otherwise than that the reports, made at intervals rapidly following one another, of the discoveries taking place in Switzerland, would have the effect of stimulating inquiry in other districts. Italy was the first to follow, by directing systematic inquiry into the subject. This is no more than was to be expected, for records of many chance discoveries were in existence, some of which, notably those made in the works of deepening the harbour of Peschiera, in which remains had been found very analogous to those in Switzerland. Some of these were communicated to Professor Keller, who pronounced upon their general resemblance and the importance of further investigations. But, indeed, inquiry had only to be made to produce evidence of a great many discoveries which had previously been made. These were eagerly sought for by Professor Bart. Gastaldi, who published, in 1862, a small volume full of records of such discoveries. At this early stage, the Anthropological Society of London rendered excellent service by the publication of a translation, by Mr. Harcourt Chambers, of Professor Gastaldi's book, under the title of "Lake Habitations and Prehistoric Remains in the Turbaries and Marl Beds of Northern and Central Italy." This was in 1865. The book is filled with records of discoveries of objects of remote antiquity, which evidently had no relation to, and were of much earlier origin than, any of the antiquities previously known which the prolific soil of Italy has yielded.

Aided by an opportune grant from the Society of Natural Sciences at Milan and the zeal of a number of explorers,—M. Desor, Sig. Stoppani, M. Mortillot, the Abbé Rauchet, Pigorini, Chierici, Strobel, and many others,—investigations were made in all directions, followed by a great number of discoveries. It is neither possible nor necessary that these should be examined in detail, but the general results are as follows. Avoiding to a great extent the larger of the Italian lakes, for the reason which was very soon recognised,—namely, that the cliffs are rocky and so precipitous that no shallow water is to be found, or any soil into which piles could be driven,—the lake builders attached themselves to the smaller lakes, where these conditions do not occur.

Several sites around the little Lago di Varese have proved to be those of pile dwellings, while the whole of the Isola Virginia has been shown to be of artificial origin, for its whole area has been found to be filled with piles, the number of which have been estimated to be between 35,000 and 40,000, the area of the piles being now filled in with solid earth, probably, as supposed by Professor Castelfranco, after a fire had consumed the earlier wooden settlement, towards the close of the Bronze Age. Articles of remote antiquity, down to others of Roman times, have been found here, the earliest at the lowest level. The small adjacent lakes of Monate, Varano, and Biandrono, and many others have all rewarded the explorers, the objects found, as at the latter place, being in many instances in regular sequence from the polished Stone Age to that of Iron.

All the sites found, so far, have been lake dwellings of the Swiss type—placed in shallow water, close to the land, with traces of a bridge across to the latter. But there is another class of buildings to which Italian antiquaries have given the name of terremare. "Mare" is, in fact, the rich, marl-like soil called marl by Prof. Gastaldi. It was noticed at an early period that these sites were to be found in places far removed from where water is now found, or at a higher level; that they had been originally surrounded by a ditch and bank, and that the original platform, supported on the usual piles of a lake dwelling, was sometimes covered by a second platform and piles; and, in some few instances, by a third, the whole being now filled in solid by what has proved to be the accumulated rubbish from droppings made from the various platforms. This deposit is now eagerly sought for by the agriculturist for the purposes of manure, and hence the constant discovery of new dwelling sites. A lengthy controversy arose with respect to the mode of erection stated above, which involves the supposition that when the thrown-out refuse came up to the floor-level of the first platform the second then became necessary; after that the third. It is but again the principle by which an Eastern village is now found to be raised on a mound, formed by the nameless droppings of rubbish which cover traces of more ancient dwellings. The weak point of the theory, to us, is, that much of the deposit seems to have been stratified by aqueous agency, and, although this might be easily accounted for in the case of the first platform, in some examples, supposing that there was then some shallow water, yet which would be an impossibility so far as regards the upper ones, except on the hypothesis that, at one time, the country was all at a much lower level, that it sank again and again, and that it has

since been raised up to a level above the present water-line. But this is not an idea that appears yet to have been discussed, and it is only mentioned since such changes of level have occurred again and again in other parts of Italy, and it would account for all appearances.

Only a few of the curious results that have already been recorded can be glanced at. At Castelnuovo the devoted explorer, Chierici, found beneath a Bronze Age terremare, indications of an older settlement. At Lagozza, no animal remains of any kind have yet been found, but ample evidences of vegetable food in the way of hazel-nuts, wild apples, acorns, two kinds of wheat, and six-eared barley. There were also traces of cherry and poppy-seeds, &c., while there were many others also found by Prof. Sordelli of wild flax. At Peschiera, Prof. F. Unger has recognised the existence of rye, and also the vine. The bones of dog, sheep, horse, ox, pig, goat are common, and occasionally the bones of men.

Many of the structures are rectangular in form, and are remarkable from the fact that they frequently face the cardinal points, or so nearly so as to justify the belief that they were set out to face sunrise at the varying periods of the year when first begun.

Our observations, so far as Italy is concerned, must close with a brief reference to the exploration of the remarkable terremare at Castione, undertaken in 1877 by funds provided by the Minister of Public Instruction, and directed by Prof. Pigorini. Judging by the area of ground excavated, the settlement consisted of a quadrangular block, with an orientation 30 deg. from east to north. The central area consists of an enormous number of uprights, which supported the wooden platform, the evidence being that the entire area below was once open, and left so as a convenient place for the deposit of rubbish. Around the block was a series of projecting buildings, like square towers of defence. These were formed of lengths of timber crossing and re-crossing at the angles, and projecting irregularly, the internal space of each being filled in solid with earth. Beyond was an earthern rampart and ditch. In process of time, the area beneath the platform became filled up, and then the builders enlarged the rampart and proceeded to erect a second platform above the first. The recent explorers have assured themselves that, although the site was once covered with water, it was not so at the period when the erection took place, but on what was then somewhat rising ground. The earthen rampart is some sort of evidence as to this; but the whole structure, with its indications of double platforms, has had to be excavated from a fairly deep bed of more recent aqueous deposit, which covers all the locality. The theory is proposed that the projecting towers were intended to render support to the earthern bank outside them,—an idea not involving very profound structural knowledge. It is far more likely that the towers were to act as external buttresses to the large internal mass of pile work. Wherever piles have been met with, feebly fixed as they must have been, and with but little, if any, strutting, except the top platform, held together, not by nails, but with the rudest tenons and mortises with pins, it is not to be wondered at that the mass of uprights would soon suffer deflection. Indeed, every photograph of the condition of either Swiss or Italian piles, taken when first found, readily indicates such deflection, and that it must have been a serious matter. Here, indeed, at Castione, the remedy proposed has not been sufficient, for the piles have all sunk out of the perpendicular, and are all deflected towards the towers.

More recent researches have revealed the fact that late dwellings or terremare are to be found all over the valley of the Po, from Verona quite away to Bologna, while the vicinity of Parma is studded with sites already discovered. In other directions the area of discovery has been great, and is constantly on the increase. In addition to the animals already noted, there are bones of the bear, fox, dog, wolf, badger, pole-cat, wild boar, donkey, roe deer, fallow deer, reindeer, sheep, hare, wood-mouse, porcupine, wild cat, and hedgehog. The horse is of two kinds, and is not uncommon. The raven, domestic fowl, stork, heron, wild goose, duck, and tortoise, have also been traced.

From Italy to Holland is not a very connected passage; but, in the low-lying lands bordering the North Sea, from West Friesland,—in fact, right away to East Friesland,—there are a great many sites which very closely resemble those of the Italian terremare, with certain differences which are readily noted. They are called Terpen in Holland, and Warfen in East Friesland. Dr. Monro, in his invaluable "Lake Dwellings of Europe," has given an interesting notice of these structures, including a visit to a terp near the town of Dokkum, or about four or five miles from the present seashore. Here, in a flat country he found the terp to consist of a slight elevation, crowed by a small, ancient church and a clump of trees. Workmen were busily engaged in the removal of the elevated mass, where not covered with buildings, for the purposes of manure, and the excavations revealed a section 15 ft. or 18 ft. high, in which he soon detected upright piles of oak in the last stage of decay, while elsewhere was a heap of oak beams recently removed from the diggings. The mass of the mound was stratified. These structures, which are very numerous in the district, appear to be those referred to by Pliny, who, in his "Natural History," describes the wretched race of the Chauci, who construct their cabins or mounds just high enough to be above the level of the sea which covers the entire land twice daily, far and wide, and who, on the receding of the tides, catch the fish entanglsd in the land.

We have, in the mound described by Dr. Monro, where the uprights were clearly intended to support a timber flooring on which the huts were erected, the same system of erection as in the Italian terremare, and also the same accumulation of earth beneath them, now quite covering the timbers, which is here, as there, highly prized by the agriculturist for manure. The objects found, however, are of later date. Up to the present time no objects of very remote antiquity have been met with, while, indeed, they continue to Mediæval times. Roman Samian ware, Saxon and later coins, tiles, &c., have been found. It is doubtful, too, if any additional discoveries are likely to arise on other sites, since exploration of several have been so completely made, the excavations revealing the entiré contents of many of these structures, leading to their entire removal. The whole character of the country is now changed, and the sea now no longer invades it, the sea-walls, erected in Mediæval times, having steadily kept out the ocean, allowing of the cultivation of the land which was once covered by its waters.

In 1883, Dr. Hartmann investigated the prehistoric structures which exist in the Holstein Fen districts, near the Elbe. Here there are artificial mounds from 13 to 23 feet high, covering structures of piles and fascines, the piles being apparently placed to keep the latter in position. The elevation was skilfully adjusted to carry the structure above the tides where the country was open to the flow of the sea, now happily excluded, and it is supposed by Dr. Hartmann to have been based upon a layer of cowdung. Above the first erection, examined in one instance, was a second, and a third above that again, the whole being now covered with a mass of *débris* as in the other cases. The belief in pile dwellings here is not entertained by Dr. Hartmann, but the general resemblance of construction goes far to warrant our idea that here, as in Italy and Holland, the mode of building was similar. The general mass of objects met with relate to very ancient times, but in one of the structures investigated, masses of iron slag were found.

The Rhine district has produced several sites, but the objects found appear to be later than those of Switzerland. That at Bebro, near Mayence, appears to have been in existence in Roman times. At Billingheim, while oak square-cut beams and pottery of late date have been found, prehistoric flint implements have been discovered at a lower level. At Gägelow, North Germany, late objects as well as early ones have also occurred. At Spandau, near Berlin, in what was formerly a lake, piles partly burnt have been exhumed, and the same may be said of many another site, already more or less investigated, in Poland, East Prussia, Livland, in Carinthia and Carniola, Pomerania, and Prussia; in Austria and Hungary; along the Danube, and many more.

At Zahsow, near Cottbus, and at Potzlow, lake dwellings on piles have been found beneath the early constructions called Burgwälle by German antiquaries. In other north-country sites curious examples of circular huts have been discovered; and at Bouslack was the curious structural feature of some of the timbers being tied together with thongs of birch.

One of the most singular constructions was that in the Lake Persanzigersee, where what had once been a small island was surrounded by sixty or more rectangular enclosures, in the water, erected in the usual manner of log huts, with horizontal beams notched at the angles. Upon these platforms had been erected, which contained the huts of the settlement. A bridge connected the island with another mound nearer the shore, which was itself connected to the mainland by a second bridge. The quantity of timber used had been enormous.*

NOTES.

We have received from Mr. John Waugh, C.E., of Bradford, his report to the Coroner on the fall of the chimney of Messrs. Thornton's mill at Cleckheaton on Feb. 24, by which fourteen persons were killed and a considerable amount of property destroyed. The history of the chimney can leave no surprise at the catastrophe. It was built in 1859 under the superintendence of a hybrid person described as "a joiner and architect." When it was 40 yards in height it was found that it had gone out of the perpendicular by about 7 in. in a south-easterly direction, a circumstance which at once showed either that the foundation was inadequate or that some of the lower portion had been badly constructed, and it ought to have been taken down again and rebuilt under better advice. It was however straightened as it stood (the particulars of the straightening operation are not given). On February 8 of this year the attention of the owner was called to signs of distress in the chimney, and Messrs. Moulson builders of Bradford sent one Harrison to look to it, who said vaguely that "the chimney appeared all right," but advised the renewing of the brickwork where the cracks and the bulge existed, for which purpose considerable portions of the brickwork appear to have been removed on each day and made good with new brickwork Harrison had, on his second visit, practically condemned the chimney, saying "you had better get out a new foundation and build a new chimney"; but this advice seems to have fallen on deaf ears.

"Before leaving for the night of Wednesday, the 24th, Harrison thought it advisable to prop 'the loose brickwork of the bulge' from the boiler-house wall; whilst in the act of performing this operation, he felt the brickwork of the outer shell press against his knees, the chimney then settled down, and finally tumbled over in an easterly direction, destroying about half the adjoining mill, and killing fourteen persons."

Mr. Waugh's Report further says:—

"In the building of a chimney it is customary to select the bricks from the very best kilns in the district, and, further, to carefully inspect such when delivered, and reject the unsound ones. Had this latter course been adopted in regard to this chimney a great proportion used in its construction would have been rejected. In fact, they were, with the exception

* To be continued.

of the firebrick, unfit for the purpose of building a chimney, even if constructed of solid brickwork. They were of various sizes, various material, and differed very much in the degree of burning. I am strongly of opinion that from some cause or another, bad as the bricks were in the first instance, that they, along with the lime, forming about one-fifth of the volume of the bricks, have both undergone a deterioration. I can attribute this marked deterioration of bricks and lime to nothing less than moisture extending over a long period. I have examined chimneys which have fallen by accident, and some by design, but I have never seen such a crushing to powder of the material of a structure as in this instance, and where bricks appeared to be stuck together in any quantity, they could be separated by hand with no effort whatever. . . . . The total weight of the whole structure was about 500 tons, the weight of the two shells above the solid was 480 tons. The outer shell alone weighed 325 tons. The distressed area, including bulge and cracks on the easterly and northerly sides, was equal to half the circumference. Therefore, if the chimney had been vertical the weight above the half the circumference would equal 162 tons, or 6·33 tons per square foot, but the chimney leaned over on this side, and it is impossible to say how much the weight was increased by this fact without a knowledge of the amount of departure from the vertical. Given this crushing weight above (apart from any lateral strains due to vibration) and a solid brick base and foundation below, with the weak places—bulge and cracks—in between, remembering the quality and condition of the brick and the nature of the structure, and the result should have been anything but a surprise. The chimney fell on the calmest day in the whole month, from a combination of causes, and in the following order as regards importance:—1st, bad bricks; 2nd, weak construction; 3rd, deterioration by moisture; 4th, the attempted repairs. Sooner or later, however, it would have fallen, apart altogether from the 4th head. The repairs were too late: the chimney was a doomed structure before either Moulson or his man saw it. In conclusion, I would say this is the second inquiry I have assisted at in regard to the deaths of persons from the fall of chimneys in ten years, making in those *two instances* alone a *death-roll* of *sixty-eight*. My earnest recommendation to the authorities is, that such structures should be annually inspected, from top to bottom, inside and out, by competent persons, and that the owners should be possessed of a certificate as to the safety of the structure as the result of such thorough inspection, such certificate of safety to be produced to Her Majesty's Inspector of Factories when required."

To which we need only add a remark as to the *morale* of false and we might say criminal economy in erecting such a structure. To save expense the chimney was proceeded with, after weakness had already shown itself before it was finished. To save expense the owners apparently refused to listen to the only sensible thing their bricklayer said about it, to have a new foundation and a new chimney. The result has been the loss of fourteen lives as well as the wrecking of part of the property. Most deplorably in this case has "penny wise" turned out to be "pound foolish."

THE *Architectural Review* (Boston) publishes an able article by Mr. R. D. Andrews, on "The Compensation of Architects," which is, in fact, an attack on the percentage system of payment. The main argument Mr. Andrews uses is the same which has been often suggested in our columns, and which must be obvious to every reflecting person, viz., that while other artists, as well as some professional men (as doctors and barristers), can get the value of superior ability in superior fees, the architect can only get this value by an increase of work, by taking in fact more work than he can attend to personally, and making his office an architecture-mill. Mr. Andrews does not forget also the minor objection (detrimental in principle perhaps rather than in practice), that by the per-centage system the financial interests of the architect and his client are directly opposed to each other. Mr. Andrews proposes that the architect should have a salary during the progress of a building, on condition of devoting a specified proportion of his time to it, and urges that it would be more economical in the end to pay out in this manner a sum twice the amount of the usual commission and secure the eminent architect's personal attention to the work. We do not think this idea would be found very practical, and Mr. Andrews seems to forget that there would be the same conflict in that case between the financial interest of client and architect, as it would be obviously to the interest of the latter to prolong the period of construction. What Mr. Andrews does see clearly, and puts well, is that the present system is not only unfair to architects of superior attainments and reputation, but inimical to the interests of art, as it prevents an architect from profiting by superior ability except by taking more work than he can attend to personally. The simplest method by far is for the architect to name a fee for which he will design and carry out the building, just as a painter names the sum for which he will paint a portrait. A man who has achieved a reputation for special genius or ability would then be able to obtain a just return for it without overburdening himself with work he could only do by proxy. There can be little doubt, at all events, that the 5 per cent. system of payment to architects is about the worst that could be devised; but (owing partly to the fact that it is officially recognised by the Institute) the public at all events seem to have an almost superstitious reverence for it, and look suspiciously upon any architect who proposes to be paid in any other way, as a half-caste kind of person who is not to be trusted.

THE outlook in the North is disheartening in the extreme, and, at the time of writing, shows but little sign of improvement. Were the Durham miners to re-commence work at once, it would still be some time before the normal activity prevailed in the district,—trade having been so seriously disturbed. The *Times*, indeed, goes the length of referring to the dispute as having already done more harm than any strike of modern times; and attributes the present deadlock to the want of a strong leader on the men's side. The absence of such a leader is very significant, for it can hardly be said that capable men are not to be found, especially in mining centres. The probability is that the heroes of previous labour disputes recognise the fact that in this case there is but little prospect of victory, and that the only way to ensure peace would be to counsel the unpalatable course of giving in. Such advice as this the majority of the Durham miners are not yet in a mood to listen to, although the proportion in favour of keeping up the strike, as shown by the ballot, is much smaller than at the outset. The last ballot showed 31,483 in favour of continuing the strike, as compared with 43,056 on the previous occasion; but only some 50,000 voted last Saturday out of a total of 92,000. The tone of the strikers at mass meetings held this week is distinctly against accepting any reduction, in spite of the many indications that the state of trade calls for it. The collapse of old-established works, together with the prevailing feeling of insecurity and apprehension, ought to convince them that their action is threatening a permanent stoppage of other industries. The folly of the engineers' strike, which has now lasted ten weeks, is so far recognised, that a number of members of the Amalgamated Society of Engineers are cutting themselves adrift from that body, and resuming work. The obstinacy of the strike committee has produced a widespread feeling of exasperation, and there is every indication that they will be defeated by the gradual defection of their allies.

AS the Metropolitan Railway Company have obtained legislative sanction to subscribe to the capital of the Eiffel Tower at Wembley, this work will, no doubt, be constructed. We assume that the public have not shown a disposition to put money into this work, but we have no doubt that this would not stop Sir Edward Watkin from carrying out his scheme. We have already stated our doubts as to whether this building,—not inside London, but like the Crystal Palace, well outside of the Metropolis,—can be a commercial success; and we are not enamoured of the principle of railway companies becoming partners in affairs outside their own legitimate business. The principle may be carried out to disastrous results, and is not altogether unlike a practice in the City by which trust companies brought out new concerns, and practically took part of the capital.

IT seemed almost beyond hope that we should be able to lay a finger on an actual monument of the battle of Marathon. This, however, Dr. Studniczka seems to have effected in his paper in the last issue (Band vi., 4, 1892) of the Prussian Archæological Jahrbuch. Every one who has recently visited the museum in the Acropolis at Athens has been struck by the fragments, vividly painted and but little below life-size, of a mounted horseman, dressed in the closefitting garb of an Oriental. These fragments, five-and-twenty in number, Dr. Studniczka reconstructs, by ingenious comparison with a plate in the Ashmolean Museum at Oxford, in which is represented a Persian bowman seated on a horse, and wearing a tiara; he holds a bow in his left hand, and carries a quiver at his side; the plate is inscribed "Miltiades Kalos." This plate, Dr. Studniczka shows, by a most careful examination of the fragments, must have been a fairly good copy of the actual statue in question. We have, therefore, in these fragments, not only a monument profoundly interesting in itself of one of the greatest decisive battles of the world, but a piece of archaic sculpture accurately dateable, and so of the first importance for the history of art. Other papers of interes in the same issue are a discussion, by Dr Winnefeld, of the plan and arrangements of the two country seats of Pliny the Younger, *i.e.*, Tusci, in the upper valley of the Tiber, and Lankenlinum, on the sea-coast. They are described, as will be remembered, in two of his letters to Domitius Apollinadris (v. 6) and to Gallus (ii., 37). Considering the scantiness of the notice of such structures by Vitruvius,—*i.e.*, private as opposed to public houses (Vitr. vi., 8),—any help to the reconstruction of their details is of great value. The concluding paper, by Dr. Winter, on a vase in the Cook Collection at Richmond, may serve to remind Englishmen that much remains yet to be done in the matter of such publications. The vase, a krater of late style, represents the adventure of Odysseus with the Cyclops, and after a fashion so far unprecedented. The escape of Odysseus beneath the ram is a familiar *type* with black-figured vase painters, but here we have for the first time a representation improved, not by the epic but the dramatic form of the tale. Polyphemus, with a huge eye in the centre of his forehead, lies in drunken sleep, while the Satyrs of Euripides gather round, and the companions of Odysseus prepare to break the huge tree-trunks. It is surprising that this unique vase has so long gone unnoticed.

M. PERROT contributes to the new number of the *Bulletin de Correspondance Hellénique* a long analysis of the style of the Vaphio cups. His article is illustrated by excellent plates. The two coloured fac-similes of the actual shape of the cups give a better idea of the gold surface than any we have yet seen, but it seems a pity to republish the designs which the archæological public already have in adequate form in the Ephemeris Archæologikè. M. Perrot comes to the conclusion,—not a new one,—that the cups are the outcome of local Peloponnesian art, and that they owe little or nothing to foreign, *i.e.*, Oriental, influence. M. Lechat publishes a beautiful little bronze statuette of Aphrodite, recently acquired by M. Carapanos, and devotes most of his paper to the discussion of the nature of bronze *patina*. He believes this patina to have been

not the result of natural decay by exposure to air or lapse of time, but to have been artificially produced,—he would call it rather "enduit," than patina. Plutarch speaks in his life of Pericles (B.C. 159) of a class of artisans at Athens known as βαφεῖς χρυσοῦ workmen who dyed gold of various colours. May there not also have been βαφεῖς χαλκοῦ?

FROM a recent issue of the *Manchester Guardian* we get the substance of the report of the City Surveyor to the Art Gallery Committee, and their remarks thereupon, on the subject of the proposed alterations to the Royal Institution. It is characteristic enough. It attempts in the first place to depreciate the interior architecture which is to be destroyed by pointing out that part of the details are plaster. At the time when the Royal Institution was built it was the fashion to execute in plaster or cement many things which would now be executed in a nobler material; but that does not affect the value of the design. But the most noteworthy point is the admission that the space gained by destroying Barry's galleries would only afford temporary accommodation for about ten years, after which it is hoped that a more ambitious scheme in the nature of a separate permanent Gallery may be carried out. So that the Art Gallery Committee of Manchester propose to destroy the most characteristic feature of the interior of a great architect's building to fit it for temporary use, and having spoiled the building irremediably, to leave it for a new one. This is worse and worse, and only renders the proposal the more indefensible.

THE St. Pancras Vestry have now their first reward in the completion of their Regent's Park Station with a plant capable of a simultaneous output for 10,000 incandescent lamps of 16-candle power each,—the whole of which has been contracted for by customers,—and 90 arc lights for street lighting of 10 ampères each. The station has been erected on a freehold site of 21,000 square feet purchased by the Vestry for 10,000*l.*; the remainder of the houses not required for the works still contributing their rents. The plant consists of nine dynamos for incandescents coupled separately to as many triple-expansion engines; and two smaller dynamos and engines for the arc lights; a boiler-house with five boilers, and a storage battery of sixty cells. There is an underground tank for condensed water containing 170,000 gallons; and surrounding the lower portion of the chimney, attached to an iron framing, is a series of corrugated iron plates over which the hot water pumped from the condensers flows back to the tank. The maximum amount of water required in the day is 200,000 gallons, so that as the water is purchased of the water company, this innovation in cooling will play an important part in the economy of the station. There are seven feeders in the distribution of current in addition to the mains, and there is an underground sub-station, with two batteries of fifty-eight cells each, on the open space by the Cobden monument in Camden Town. The mains are laid on the three-wire system, the conductors being of copper strips supported on insulators. The culverts are of concrete, with asphalted roofs to render them waterproof. The street lighting is very good, the arc lamps being carried on handsome cast-iron standards 25 ft. high, and placed centrally in the road at about 200 ft. apart. In all the details great care has been taken by the Vestry's engineer, Professor Henry Robinson, of King's College, to whom the work was entrusted.

WE have received from Mr. Brandreth, architect, a scheme for a Public Works and Construction Stock Exchange, 'an Institution constituting a link between the different branches of the builders', the contractors', and the engineers' businesses under the dome of a central hall in London." The further objects which such an Institution might serve are thus stated in Mr. Brandreth's letter or prospectus:—

"A practical and permanent Building and Construction Exchange with a classified exhibition of specifications, plans, samples, models, tarifs, price lists, adjudications, tenders, the latest notices and advertisements relating to work at home and abroad and the leading English and foreign technical papers.

A market for the introduction of new projects, and for dealings in matters relating to the aforesaid trades in all their branches, the sale and purchase of materials by private treaty or public auction.

A financial centre for the negociation of monetary transactions, contracts, agreements, referring to advances, mortgages, purchases and sales of land and building property, on strictly impartial principles and with the least possible expenditure of time and money."

That such an institution would be useful if it could be established and kept going is very probable, but it is not very easy to see where the funds are to come from. Similar attempts have been made before and have not answered practically.

WE learn from the *Magazine of Art* that the Hanging Committee for the Royal Academy Exhibition this year consist of Messrs. Calder Marshall, Brock, Calderon, Gow, and Dicksee; two sculptors and three painters. Architecture, we suppose, is left to take care of itself.

THE Court of Contributors of the Edinburgh Royal Infirmary have, with only three dissentients, approved of a scheme for the extension of the hospital, the cost of which is estimated at 100,000*l.* The additional buildings will be situated immediately to the west of the present infirmary, and will occupy the site of the Sick Children's Hospital, which has been demolished, and the site now occupied by one of the Schools of the Merchant Company. The Directors of the Sick Children's Hospital have secured the School of the Trades Maiden Hospital, at Rill Bank, which will be adapted to the purposes of the hospital, and additions will be made thereto, for which the ground annexed affords ample scope.

THE *Daily News* of last week printed some letters concerning York House, Strand, and its water-gate,—the latter now lying neglected, in a hollow of the Embankment-gardens. What we believe to be the true story of the house and gate is as follows: In the sixteenth century a town "inn" of the Bishops of Norwich stood next eastwards of Villiers-street. In or about 1535 the inn was exchanged to Charles Brandon, Duke of Suffolk, for St. Bennett Holme Abbey, Norfolk. The house was bought for, or by, Heath, Archbishop of York, *temp.* Mary, but reverting to the crown in her sister's reign, it was let to the Lord Chancellor Egerton, and then to Sir Nicholas Bacon, whose son, Francis, as he himself tells us, was born there. By an Act of May, 1624, King James I. obtains possession of the property, which he grants to the first Duke of Buckingham. Whether Buckingham rebuilt the house or not is not exactly known. Campbell says, in *Vitruvius Britannicus*, that the water-gate was erected by Buckingham when Lord High Admiral of England in 1626. Its design is commonly attributed to Inigo Jones; yet some would ascribe it to Nicholas Stone, the elder, upon evidence contained in the Soane MS. list written by Charles Stoakes of some of his uncle's most eminent works.* Having sold the property for, we think, 30,000*l.*, the second Duke of Buckingham went to live on College-hill, Upper Thames-street. The site was then cleared for building purposes, and York-buildings is now known as Buckingham-street.

* We discussed this matter in an article on June 21, 1879, vol. xxxvii., 677. See also our vols. xii., 252, and xxii., 450, *in re.*

WE have received a number (containing two parts) of the *Zeitschrift für Bauwesen* (Wilhelm Ernst & Sohn, Berlin), a periodical devoted to matters concerning architecture and engineering. Its scope is wide, embracing such articles as timber buildings in Brunswick, the mechanics of railway lines, the drainage scheme of Naples, and a list of buildings, both small and large, erected during 1890 by the State of Prussia, the particulars being carefully arranged under several columns; one devoted to ground plans,—a very interesting and valuable item. The larger buildings,—technical high schools, laboratories, &c.,—and the humbler buildings of the Pfarrhaus class are treated in the same way. The value of the plans would, however, be increased by having scales attached, especially the larger ones. Issued separately from the letterpress is a series of plates illustrating the various articles. Some are reproduced from photographs, others from pen drawings. A very curious house forms one of the plates illustrating the timber work of Brunswick, work from a town and district which is not so well known to Englishmen as other parts of Germany. There are also a number of plans of a large asylum for the insane at Landsberg, and the building of the Berlin Electrical Works, which naturally derive more interest from their plans than from their elevations. Altogether the publication seems well got up and carefully printed.

AT a general meeting of the Royal Scottish Academy held in Edinburgh last week for the purpose of electing Associates, no less than seventy nominations were made. There were twelve vacancies to fill up, four of which were caused by the deaths of four Associates, and the number had to be made up to twelve in terms of the new charter which provides for an increase of the number of Associates. Amongst those nominated were twelve architects, viz., Messrs. H. J. Blanc, Edinburgh; G. Washington Browne, Edinburgh; G. Burnet, Glasgow; Campbell, Glasgow; J. Dunn, Edinburgh; J. Honyman, Glasgow; Kinnear, Edinburgh; W. Leiper, Glasgow; J. Keppie, Glasgow; Sydney Mitchell, Edinburgh; J. Maclachlan, Edinburgh; and Boss, Inverness. Of these four secured the necessary number of votes, viz., Messrs. W. Leiper, Washington Browne, H. J. Blanc, and J. Honyman. Mr. Leiper was one of the first four at the top of the poll, and, therefore, becomes a full participant in the benefits of the Associateship, filling as he does one of the vacancies under the old charter. The other three who are in a similar position are Messrs. John Rhind, sculptor, Edinburgh; A. D. Reid, painter; Edinburgh; and John Lavery, painter, Glasgow.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE eleventh general meeting of this Institute for the present session was held on Monday evening last, the President, Mr. J. Macvicar Anderson, in the chair.

Obituary.

Mr. William H. White said that it was with deep regret that he had to announce the death of Mr. Thomas H. Eagles, Fellow, Professor of Architecture at Cooper's Hill College, and a member of the Institute's Board of Examiners. He also regretted to announce the death of Mr. John Murray, Honorary Associate of the Institute.

Mr. John Slater said he thought that the death of Mr. Eagles, who was a comparatively young man, inflicted upon them one of the most deplorable losses that they had had to record of late. He had only recently taken a seat at the Examination Board, where his services had been of the greatest possible value, owing to his knowledge and attainments being of a kind not common amongst architects. The Board of Examiners would hear of his death with very great regret.

The Examinations.

The President said he had now to report the results both of the recent Preliminary Examination and of the qualifying Examination for candidates for the Associateship of the Institute, which were held during the month of March. For the Preliminary Examination there were 74 new applicants, and six who had been previously relegated to their studies made the total number of applicants 80; 35 of these were examined in London and 13 in Manchester, 29 were exempted in accordance with the regulations, and three did not attend. Of the exempted candidates, 9 were relegated in London, and 3 in Manchester, making 12; 36 candidates passed, and these, with the 29 exempted candidates, the 12 who were relegated to their studies, and the 3 who did not come up for examination, accounted for the total of 80. In the Examination in Architecture, qualifying for the candidature for the Associateship, there were 71 new applicants, besides 21 candidates relegated to their studies on previous occasions, making a total of 92. Of the new applicants, 11 were not admitted on account of their probationary work not being sufficiently good; 70 candidates were examined in London,—and it was no easy matter to accommodate them in the Institute rooms, which presented a very busy sight indeed, 70 men all working at the examination at once,—and 11 in Liverpool, making 81. Of these, 38 candidates passed in London and 11 in Liverpool, making a total of 49 who passed, 32 candidates being relegated to their studies for a further period. The result of the Examination in point of numbers appeared to be eminently satisfactory, and not the least satisfactory feature about it was that a considerable number of the applicants had been relegated to their studies, inasmuch as it showed that the examination was a real one. The names of the successful candidates in this examination were as follows:—

Angel, R. J., Liverpool
Ayling, R. S., London
Bain, J., London
Baker, C. W., London
Blakey, J. W., Liverpool
Breden, A. C., London
Bridgman, N. G., Paignton
Burt, W. H., London
Child, E. H., London
Cleaver, A. W., Leytonstone
Cooper, T., London
Corlette, H. C., Sydney, N.S.W.
Cranfield, S. W., Enfield
Cummings, E. S., Edinburgh
Dobie, W. G., Birkenhead
Ford, G. M., London
Goodman, H., London
Grace, W., London
Greene, W. H., Liverpool
Greenslade, S. K., Exeter
Hack, M. S., Leicester
Hale, A., Birmingham
Harvey, F. M., London.
Hodgson, J. L., jun., Heaton Moor
Houston, A. C., London
Howdill, C. B., Leeds
Jarvis, A. W., London
Jones, E. H., Liverpool
Kennedy, D. W., London
Kitchen, L., Manchester
Maclaren, T., London
Mansell, T. G., London
Murray, J., Greenwich
Ough, A. H., London
Passmore, H., Whetstone
Paxton, J., Kilmarnock
Rees, T. T., Birkenhead
Reid, R. A., London
Rix, R. A., Croydon
Sakurai, K., London
Saunders, J., Oldham
Shearman, E. C., Buenos Ayres
Thornton, E., London
Vaughan, W., London
Walker, B., Birmingham
Warburton, A., Bolton
Ward, F. E., Belfast
Watt, J. C., London
Wills, F. R. G., London

M. Chipiez's Model of the Parthenon.

The President said that before the reading of the papers was proceeded with, Mr. Statham would make a short communication in reference to M. Chipiez's model of the Parthenon.

Mr. H. H. Statham said he wished to endeavour to clear up the point which has been raised by M. Chipiez in his letter * in regard to the model of the Parthenon, which was made, as was understood, under his direction, and which had been purchased for America and set up in New York. The two mistakes that he (Mr. Statham) particularly referred to were that the metope sculptures were at the wrong end,—that was to say, the metopes of the east end were under the pediment of the west, and *vice versâ;* and the next was as to the entasis of the columns. In regard to the first, M. Chipiez said that the model was sent over in pieces numbered, and that they must have put it up wrong in New York. They must accept that explanation. With regard to the entasis of the columns, he could not understand M. Chipiez's argument. He said that his model was made from a photograph which showed quite as great an entasis as he showed, and that if the photograph which was sent over from America showed a greater entasis, it must have been a mistake made over there. He (the speaker) could only account for that by supposing either that the Americans had remodelled the columns to suit their own ideas, or that the laws of optics were different in Paris and New York. He had brought a pretty large photograph of the Parthenon, and anybody who applied a straight-edge to the uninjured lines of the columns would see that it showed absolutely straight lines, as everybody knew that it must do who knew the facts. The deviation from the curve was less than half an inch in a height of 31·43 ft. The American photograph of the model was taken from the front of the model as it stood in New York, and if one looked at it closely, one would see that although the columns were only half the scale of the photograph of the actual remains, there was quite a visible curve in them, although the actual height was only about $3\frac{1}{2}$ in. in the photograph, and no such curve could show on that scale. He confessed that he could not understand M. Chipiez's explanation. He believed Mr. White had some other photograph to produce, and he should like to know what really was the truth of the matter. It was obvious that the columns as shown in the New York photograph were wrong, and that they showed a degree of entasis which did not exist in the Parthenon, and that they professed to be from a model which was made in Paris, and which was afterwards purchased and set up in New York. He had only one other remark to make, and that was that it appeared to him from M. Chipiez's letter (and Mr. White would correct him if he were wrong), that in furnishing the data for that model he had neglected what was really the best source of accurate information, and that was the book of their distinguished member Mr. Penrose, which contained exceedingly minute measurements from the Parthenon, from which the actual facts of the case could be got. If so, he thought there was some justice in the complaints which had been made, that the French architects, in restoring buildings in that way, did to some extent neglect the information which they might get from English sources, and that they had neglected it in the present case. He saw no reference in M. Chipiez's letter to Mr. Penrose's book, or to his having got any facts from that book. If he had referred to it, he would have got the facts correctly; whereas, so far as he (the speaker) could understand at present, it seemed that he had not.

The Secretary, Mr. W. H. White, said that as he happened to have the honour of knowing personally that distinguished architect M. Chipiez, they would perhaps excuse his taking up a few minutes in reply to the statement made by Mr. Statham. M. Chipiez had sent over a photograph of the model as it was taken in Paris, while it was still in his hands. This model, which was sent over to New York in hundreds of pieces, had to be put together again, and possibly there might have been some errors in putting it together, for, in a letter just received from M. Chipiez, he said:—"I have not furnished any drawings for the existing parts of the Parthenon. In accordance with his contract the sculptor caused the necessary working drawings for those parts of the model to be made by an architect of his own choice, and he did this after the measurements of Mr. Penrose. In the workshop of the sculptor I placed the metopes in their regular order, with the book of Michaelis in my hands." He added that, in the temporary and too hasty putting together of the model at the Exhibition of 1889, the order was inverted by the sculptor, and hence the same inversion occurred, no doubt, at New York. With regard to Mr. Statham's error (if he would excuse his saying so) that the entasis of the columns in the model was determined by photographs of the actual Parthenon, he thought that in his letter M. Chipiez did not state that. The entasis was decided by the drawings provided for M. Chipiez, and not made by him.*

The Construction of the Central Pillars of Milan Cathedral.

An abstract of a paper by Signor Beltrami on this subject was read by the Secretary, Mr. William H. White.

The author said he was glad to supplement Mr. Somers Clarke's Paper on "The Fall of one of the Central Pillars at Seville Cathedral," with the result of investigations carried on at Milan Cathedral. The Ministry of Public Instruction authorised a committee of architects and builders to carry out the investigations, with the object of ascertaining how the central pillars had been built, the causes of their decay, and the most satisfactory remedies to keep them in repair. The south-eastern central pillar was drilled to the depth of 97 centimètres, boring two blocks of marble, after which was a core of common stone (*sarizzo*). The same pillar was drilled through the course below, and the *sarizzo* was found at a depth of 35 centimètres. In the north-eastern pillars the *sarizzo* was met with at depths of 66 and 94 centimètres in one course, of 58 centimètres in the course under, and of 28 centimètres in the course above. Thus proof was obtained that the thickness of the facing of marble varied from at least 28 to 97 centimètres; that the builders of the Cathedral had meant to erect the central pillars as solid shafts; and that they considered the resistance to pressure of the white marble equal to that of the *sarizzo* stone. From a list of building material (date fourteenth century) preserved in the archives of Milan, *sarizzo* cost a quarter the price of the marble, and the author thought the use of small pieces of marble in the core of the pillars might be accounted for on the supposition that they were too small for decorative purposes. Experiments to test the actual resistance of the two materials were made by the Building Construction Department of the Technical Institute of Milan. These experiments proved that the average resistance of the stone was about $\frac{54}{65}$ of that of the marble, and that the weight supported by each was $\frac{1}{9}$ of its resistance to pressure, and $\frac{1}{13}$ of its resistance to crushing. Signor Beltrami then turned to the nature and causes of the decay of these pillars. The white marble came from the quarries of Gandoglia; and its saccharoid texture varied from the granular to the perfectly crystalline, and sometimes to the spathic form, the general structure being spathic. The *sarizzo* is a stone extracted from the sediments of the glacial period in the northern side of the valley of the Po. Its structure is granitic, much varied in texture. Of these two materials in Milan Cathedral the marble only showed signs of decay, which consisted in fractures or fissures perpendicular or tangential to the surface of the pillars. The former were to be attributed to the inequality, or occasional imperfection, of the surfaces of horizontal contact; or to the oxidation of the iron clamps originally used to bind together with the central mass the moulded blocks forming the surface of the pillars. Such fractures and splits were not, however, to be considered as dangerous, especially when limited to one course of masonry, and ought not, therefore, to be made a pretext to tamper with the original surface of the stonework. The tangential fractures and chipping off of the edges of the facing courses were caused by the fact that in many cases the pressure was transmitted from course to course along the edge; or else by a concentration of the pressure around the periphery of the pillars consequent upon the condensation of the mortar. The peculiar nature of the fissures was due to the spathic structure of the marble; and that defect should be considered as a natural consequence of the care taken by the mediæval builders to obtain a perfect surface in the pillars they erected, and to prevent damp from penetrating into the cores of the pillars. Only the larger fractures were to be repaired, such as were dangerous or altered the architectural appearance of the masonry, leaving untouched the minor ones as testimony of its peculiar structure, its form of decay, and of its age. Signor Beltrami concluded his paper with a reference to the opinion of Mr. Somers Clarke, F.S.A., that Seville Cathedral "stands far above it" [Milan Cathedral] "as a specimen of mediæval,"—an opinion Signor Beltrami thought it not easy to discuss, as the two buildings were not erected contemporarily, and were not of the same size. In any case he believed Mr. Somers Clarke would change his opinion were he to verify on the spot that the vaults of Milan Cathedral are *not*

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* The result seems to be that all the mistakes are admitted, but M. Chipiez denies responsibility for them. If so, why was the model referred to in all the French architectural papers as "M. Chipiez' model?" If the model was supposed to be based on Mr. Penrose's measurements, there has evidently been a mistake in applying them.—H. H. S.

"domes with ribs on their faces;" that its columns are *not* "quite cut off from the members above them," and that the windows are *not* "in many cases half sham."

Mr. R. Herbert Carpenter, F.S.A., said he had a letter from Mr. Somers Clarke on this subject. He wrote:—"What the Signor says about the materials of the pillars at Milan is very interesting, and supports my view that had the pillars at Seville been well built and of good stuff, they would have been of ample strength to do their work. The dimensions I gave were taken: (1) from rough measurements of my own; and (2) from the book issued to competitors for the façade, of which I got a copy at Milan. In answer to the concluding sentences of the printed paper, I have to say—1. That I have visited the Cathedral of Milan several times. 2. That I cannot affirm that the vaults have not the ribs through their substance; but I can affirm that they are domes rather than intersecting vaults. They are not on the lines of the best Mediæval vaults. 3. I respect Signor Beltrami's statement very much, but I can only affirm what every student knows,—that the columns are quite cut off from the members of the arch above them. A reference to the drawings I have referred to shows this, outside one's examination of the church itself. 4. The same drawings show the clearstory windows of the centre nave to have their lower part opening into the nave, their upper part opening above the steep sides of the very domical vaults. This is very easily seen as one walks along the aisle roofs. I very much respect Signor Beltrami for sticking up for so glorious a fabric as Milan, and in comparing it with Seville I have wished to treat it with all respect, but—facts are facts."

Mr. Alexander Payne proposed a vote of thanks be accorded to Signor Beltrami for his paper and present of books.

Professor Aitchison, A.R.A., seconded the vote of thanks to Signor Beltrami. They were extremely indebted to him for sending them copies of his works. He was one of the most distinguished architects in Italy. They should, he thought, elect him as an Honorary Corresponding Member.

The vote was passed by acclamation.

Wrought-Iron Work: The Renaissance Period.

Mr. Starkie Gardner next read a paper on this subject, copiously illustrated by lantern-slides. In his preliminary remarks, Mr. Starkie Gardner said he considered the industry of ironworking, like every other art, subject to fixed laws which had regulated its growth, development, and decay. Its signs of youth were seen in a robust and playful vigour when the smith manipulated the hot iron with his hammer without any adventitious aid, the forms thus obtained being unsophisticated and without refinement. The next stage was in introducing organic forms, in a decorative, not a superstitious, sense, by the use of smiths' tools alone. Its maturity was reached when such crude results were no longer deemed satisfactory, and the file, saw, chisel, drill, and punch were called in; the introduction of mouldings, tracery, and other architectural features necessitating more cultivation in both designer and executant. Next, greater finish still was required, and the iron had to be turned on the lathe, polished, carved, chased, &c., in fact, treated as a precious metal, —wholly apart from painting in colour or gilding. That, as the last step, denoted old age and approaching death. After that might come a renaissance, when the process would begin again, the phases of development following, however, with greater rapidity, and even concurrently. In Italy the smith's art had made considerable progress during the period of Gothic architecture. Church grilles, its principal expression, were almost always based on the quatrefoil, which was merely a development of the circle, and that itself probably suggested by the effect of the leaded roundels with which St. Mark's and other churches were glazed. The quatrefoil certainly became the traditional form, and grilles of that design were often surmounted by very deep friezes and crestings of the richest work. The Doge's Palace and others seemed to possess nothing more decorative than latticed grilles; these, however, occasionally showed a desire for better effect, and the fifteenth-century *Casa* had some beautiful traceried grilles in the window-heads. The open scale pattern grilles at St. Mark's were copied in 1481 by Pietro Lombardo in the Vendrami Palace. A far more decorative effect was obtained by scrolling up the ends of the scales, as seen in the Manzoni Palace. From these to window grilles of C scrolls placed vertically and in all possible directions was a natural and inevitable development. Under Sansovino the style was at its zenith, and spread far beyond the limits of Venice. Italian smithing reached maturity about the close of the fifteenth century, and was ripened, perhaps, almost to decay when "Vitruvius" and its overwhelming influence, leading to an entire suppression of decorative ironwork in buildings, gave architectural smithing its *coup de grâce*. A renaissance took place when Palladian architecture degenerated, and, though smithing was feeble, it marched onwards to the Italian version of the French rococo. In Germany it was otherwise; the laws of Vitruvius were not current over the border, at least as far as concerned ironwork; the smith had a free hand, and his art had for once an opportunity of showing of what magnificent developments it is intrinsically capable. Considering the advantages, however captivating the work might seem, the result was disappointing; the designs were the same for a palace or a church, the guest-chamber or the grave, and all changes were rung on three leading themes: the thistle, the passion-flower (both introduced in the Gothic Period), and the threaded work. The thistle in the Renaissance had its curving leaves fashioned into rich grilles formed entirely of intertwining scrolls, a grand example of which, from Lübeck, was as late as 1784. The passion-flower, the origin of which seemed to have been the twelfth-century iris, was a favourite as far as the German language was current, and consisted of erect and recurved petals, &c. There was at first no intentional reproduction, but as the work became richer the resemblance became strikingly apparent, and must have been purposely heightened. The flower was invariably combined with the typical threaded work traceable to the early French lattice grilles; and, after relatively simple stages, became elaborated with bewildering complications, as many as 400 threadings having been counted in a single specimen. Examples in the cathedrals and churches extend from 1550 to 1672, and an offshoot of the style showed the sheathing leaves growing in the reverse direction,—a variety much used in grave crosses, and taken originally from an attempt to introduce the snail. In the Baroque style broken scrolls and acanthus leaves were introduced, and following that was the German Louis XV. work. Before turning from German ironwork Mr. Gardner referred to the contemporary locksmiths' work, the designs for which were, he said, far more varied and fantastic than those for grille-work, and he mentioned the carving of even equestrian statuettes out of solid blocks of iron. The remarkable fact about Flemish ironwork was the rapidity with which it developed; but under the Renaissance little was made beyond wall anchors, kitchen utensils, finials, and door furniture, &c., all of which, especially shutter-hinges and fastenings, had quite a peculiar style. At a church at Bruges, however, there was a pair of gates of an interesting style, made in 1690, which constituted an example of an arrested development. The guild and shop signs were remarkable, preserving an altogether Flemish rotundity of curve, though French in details. The Flemish art was most noteworthy, however, for being the parent stock of the magnificent school of Spanish ironwork. Spain seemed to have realised with a rush the great capabilities of iron. First, the Flemish grille was imported into the churches; next,—a bold step,—crestings were added to them, directly borrowed from liliaceous plants; next, the grilles were carried three stories in height; and, finally, the details were translated into their fine new plateresque, and the freest play given to the imagination with the most astounding results. The colossal *rejas*, produced between 1500 and 1600, which screened the *coros*, high altars, and chapels, the author considered the most magnificent specimens of the smith's art extant; not unfrequently they reached a height of 30 ft., and they were divided into several tiers of long balusters, often enriched with leaf work forged and carved out of solid iron. These piers were separated by deep bands of the richest scroll and arabesque work, nothing, apparently, being too ambitious for the smith to successfully achieve. The artificers were known in many cases to have been in holy orders. The extraordinary perfection to which Spanish ironwork had reached was even more apparent in the arms and armour, where, too, the Moorish influence was decided. It declined rapidly with the Baroque, but no country so abounded with it. In the south every house had well-designed balconies and window grilles, &c. In France the Renaissance found the art deeply rooted, and affected its traditions but little; the most beautiful and refined ironwork ever executed was the French late Gothic and early Renaissance work. The pierced steel locks had reached a point beyond which real progress was impossible, and the transition simply meant that such sumptuous works slowly lost Mediæval features and followed Classic models. Under François I., due to Italian influence, an abrupt change was seen in the locks; and the lock covers, instead of being chiselled and formed of layers of pierced work, were embossed in high relief out of single sheets of iron. Bolt cases and knockers were treated in a similar manner. But far more beautiful and satisfactory were the exquisite keys, purse-mounts, flambeaux, &c.; for beauty of design and for refinement they, as a rule, far surpassed Italian work, although usually mistaken for it. During the perfecting of the locksmith's and armourer's work, there appeared to have been little demand for ordinary blacksmith's work; a grille made for Henri II. was a mere series of parallelograms with crescents, but the finials showed more originality of design. The germs of the new school were first discerned under Henri IV., and under Louis XIII. a fully developed style was found, which rapidly developed until it reached its culminating point under Louis XV. During this period nearly every cathedral in France and Belgium seemed to have had new choir and chapel grilles, and the demand for high-class smith's work must have been prodigious. Mr. Gardner then turned to the art in England, which he considered, although enjoying the least consideration in our museums, as the most valuable and interesting to the English. Unfortunately, the art had sunk so low that during the Renaissance it practically was a missing chapter in the development of the native arts. From the practice of fencing in church monuments with iron rails, one might best judge of the state of iron working. The series in the cathedrals was most valuable. During the Renaissance they were no longer made of massive bars, and the traceried cornices and buttressed angles also disappear towards the sixteenth century — only the closely-set lighter bars with small spear points, or sometimes ending with *fleur-de-lis*, remain. The finest series must have been in Westminster Abbey, and several examples were mentioned by Mr. Gardner, including the rail to the tomb of Dean Wotton, 1566, in Canterbury Cathedral. Good examples of a later style existed at Old Chelsea and other churches. Among the rarer objects was the valuable herse or canopy in Tanfield Church, and that in South Kensington Museum from Snarford Church. After describing in considerable detail a fine alms-box in St. George's Chapel, Windsor, door-hinges, especially those at Dartmouth Church, together with the wrought-iron columns there supporting the gallery, Mr. Gardner turned to lock-plates, which, though not rivalling those of France, Belgium, or Germany, began to show, during the Renaissance, design of a higher order. Rich locks, especially of James I. and Charles I. periods, were more often of brass, but the keys were of iron and of the most exquisite finish. After describing in detail specimens of English locksmith's work, the author dealt with flat work, of forged bands cut into arabesques, scrolls, and other figures, of which the so-called cradle of Henry VI. in the Ashmolean is a good example. The gates to the chapel in Farley Castle show the work on a larger scale, while the staircase at Holyrood seems to show what an Elizabethan iron stair might have been. The oldest strap work in a church hour-glass-stand is 1597, with a wheel arabesque design; and another, dated 1636, introduces branches of oak. These and other examples of knockers, work on chests, door and window furniture, &c., show that, though rude and uncared for, the English smithing was full of character, quaintness, and individuality; and, had the architecture shown any disposition to make use of it, might have blossomed into a fine industry.

The President, in inviting discussion, said that there were few subjects possessing a greater charm for architects than that of wrought-iron work. They had had the privi-

lege of listening to an exceedingly admirable paper by an able expert on the subject. He thought the paper possessed a unique value.

Mr. H. H. Statham said he had very much pleasure in moving a hearty vote of thanks to Mr. Starkie Gardner for the interesting sketch which he had given of the history of the subject, and for the interesting series of illustrations which he had shown to them. There were, perhaps, one or two ideas which the paper suggested. One was the absurd mistake which was committed when realistic foliage was introduced into wrought-iron work. Two or three illustrations of that had been shown: they were useful as warnings, in that they were opposed to all true canons for the treatment of the work. Another thing that occurred to him was that considering that a number of the examples were based upon certain vegetable forms,—he alluded to those which were properly conventionalised,—after all, very few of the available forms of the vegetable world had been used as a basis of design in wrought-iron work. The examples which they had been shown, although there was a considerable variety in the treatment of them, really represented but a very few types, when one came to add them up. That fact suggested what a large field there was for new treatment in wrought-iron, and what a scope there was for a far greater variety in design than at present existed. It had often occurred to him, in looking over designs for wrought-iron-work, that one saw very much the same ideas over and over again,—the same kind of leaf, treated more or less satisfactorily, the same use of spirals, with a little variety in the way of working them or placing them, and very little attempt to get anything different from what had been done before. In the illustrations which had been shown by Mr. Gardner, they had seen a great variety of treatment of design from very few types. The types of nature were almost endless, and the aim of the modern worker and designer in wrought-iron should be to make the most of the hints which existed in nature; he should turn to forms which had not been worked out already; he should endeavour to evolve something new in wrought-iron work, of which we did not see much. Modern taste in wrought-iron was very much better than it used to be. We seldom saw things in such bad taste as we saw thirty years ago. Those with a turn for designing wrought-iron work should devote their energies, not only to excellence of execution and to purity of taste, but to the selection of new forms suitable to the material.

Professor Aitchison, A.R.A, said he had great pleasure in seconding the vote of thanks, for personally he felt extremely indebted to Mr. Gardner for showing him those splendid specimens of Spanish ironwork, with which, he was sorry to say, he was entirely unacquainted. He thought this Spanish ironwork was the finest of any ironwork he had seen. There was, doubtless, a peculiar charm about work roughly done on the spur of the moment. Although the rococo work of Louis Seize was not beautiful in itself, still the way in which it had been treated by some of the ironworkers was remarkable. There was an iron screen in one of the churches at Munich which was the most wonderful instance of delicate wrought-iron-work that he had ever seen. It was certainly worthy of a picture being made of it by an accomplished artist. The fine artistic way in which the iron was treated was quite unlike anything that he had seen before, and reminded one of the curled leaves in a young plantation. We of the present day were no doubt like the Athenians,—we were ever looking for something new; and it was the characteristic of every generation that it wanted something different from that which had gone before. But the thing we wanted was to get ironwork properly treated, with such slight variety as the taste of the day might call for. The only other thing he wished to refer to was Mr. Gardner's remark, that in future wrought-iron might be used as a medium for modern architecture. It was, however, too large a subject to attempt to enter on at any length, but he might say that iron had one great peculiarity which we wanted particularly at the present time. There was no doubt that architecture, when it went on again, would take a new development, and that development might possibly take place in the moulding of the material to the shapes that the strains indicated. Iron being a costly material, we were now obliged to give it the shapes that it should have to meet the strains, only at present no architect had been fortunate enough to put these forms into an architectural shape, nor to ornament them characteristically. There certainly appeared to be a vast field for the exercise of invention in the application of new and appropriate shapes of ornament.

Mr. J. Hunter Donaldson, as a visitor, spoke of the great difficulty there was in obtaining photographs of old ironwork in the Italian cities.

The vote was passed by acclamation.

Mr. Starkie Gardner, in reply, said that as a botanist he was quite alive to the endless forms which nature provided from which we might take hints in designing ironwork. But, practically, and as a matter of every-day ezpediency, one had more or less to follow the styles of ironwork that were recognised. Very few buildings would, he thought, admit of entirely fresh treatment,—entirely fresh departures in their ironwork. They had to be more or less assimilated to the styles and periods in which architects were working.

The proceedings terminated with the announcement that the next meeting would be the annual general meeting, on May 2, to discuss the annual report of the Council.

LITERATURE AND ARCHITECTURE.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association, held on the 1st inst., Mr. F. T. Baggallay, President, in the chair,

Mr. E. S. Gale, Honorary Secretary, announced a donation to the general fund of the Association of 10*l.* from Mr. J. A. Gotch; and some donations to the Studio and Library. He also announced that a prize of 5*l.* 5s. had been offered by Mr. James Brooks, open to any member of the Association, for the best set of measured drawings of the vaulting of Christ Church Cathedral, Oxford. He moved a hearty vote of thanks to the various donors, which was carried by acclamation.

On the motion of Mr. F. T. W. Goldsmith, a vote of thanks was accorded to Mr. J. Wolfe Barry for permitting the members to visit the Tower Bridge on a recent occasion.

This being the last ordinary general meeting but two of the present session, Mr. E. S. Gale, in accordance with By-law 31, on behalf of the Committee, submitted a list of members willing to serve as officers and members of committee for next session. It would be premature to give this list *in extenso* now, but we may mention that Mr. H. O. Cresswell was nominated by the Committee to fill the office of President. Subject to the terms of the By-law, it is open to members of the Association to nominate other gentlemen to serve as officers or members of committee.

Mr. Horace Townsend then read the following paper entitled "Literature and Architecture":—

Mr. President and Gentlemen,—When last year I had the pleasure and honour of appearing before you in this place, I remember that I had to frankly appeal to your more charitable sentiments in that I came before you bearing but little with me that might prove of material advantage to you, the active professors of an art which has about it much of the practical as well as of the purely æsthetic. You were hospitable enough upon that occasion to receive me with all friendliness and courtesy, and to grant me so full and free a pardon for my first offence, that you yourselves are surely to blame if I have presumed upon those expressions of goodwill to travel to-night yet farther from the straight pathway of rectitude and virtue in that same regard. Your Friday evening meetings here are, I take it, of the nature of educational symposia, and those who are so far dignified by you as to be invited to take prominent part therein should, as a rule, endeavour to add something to the general stock of architectural knowledge.

Judging from the list of subjects upon which, during the session now drawing to its close, you have been enlightened, I am rejoiced to be able to say that I am probably the one striking exception which helps to prove this undeniably meritorious rule. But I may at least lay this flattering unction to my soul, that, were I not to exhibit so striking a contrast to my utilitarian predecessors, you would never perhaps realise how exceedingly edified you had been by them in the past—you all of you, I am sure, have too much of the artistic temperament to be indifferent to the value of the judicious apposition of strength and weakness. And yet, perhaps, though no precisely gaugeable amount of instruction is to be imparted to you this evening, the time devoted to considering, however perfunctorily, the relations of two such leading arts as Literature and Architecture, even if those relations are at present not the most intimate that can be conceived, will be time not wholly misapplied.

In the little journey into the abstract we are about to take, the deviously winding side paths rather than the direct high roads are likely to lead us to the most advantageous spots, and the subordinate phrases and variations will probably in our ears sound more pleasingly than the main theme. The old book-men of the Middle Ages have won the scoffs and sneers of more enlightened generations because it was their pleasing custom to debate at prodigious length as to how many angels could dance on the point of a needle. Owing to the regretable absence of the ubiquitous reporter on these interesting occasions we are debarred from any exact knowledge of the tenor of these discussions. I can myself, though, see no reason to doubt but that they were at least as provocative of material advantage as a modern debate on such subjects as, for example, "whether Architecture is an Art or a Profession," for consider how many side-issues of absorbing interest might have been raised, from deliberations concerning the angelic host to the more mundane considerations touching the economic history of the needle itself.

Do not, however, imagine for one moment that I am going to subject you to the risk of incurring the pains and penalties earned by those guilty of even tacitly aiding and abetting the criminal who is in unlawful possession of hard-and-fast theories concerning either literature or architecture. I do not even intend to confine myself over strictly to my text, but merely to consider, somewhat casually perhaps, but I trust not altogether unprofitably, such questions as the conjunction of the names of two of the leading arts may serve to suggest. It will not be unprofitable, in the first place, to indicate such points of comparison as offer themselves between literature on the one hand and architecture on the other. At first I am sure you will all be disposed to say that no two arts could be more dissimilar or have fewer features in common, save, perhaps, such abstract and underlying æsthetical principles as are common to art in general. A little reflection, however, will I think convince you that if they are unfortunately, as I shall later on endeavour to point out, a little less than kind, they are, if not more, at least no less than kin, and that certain special artistic faculties nurtured by the follower of one need but the merest differentiation to be of service to the other. Thus the basis of artistic literary form, whether displayed in the guise of poetry, fiction, or the drama, is undoubtedly construction, and the constructive faculty is after all but a specialised and somewhat theorised sense of planning, such as finds its place among the most important and necessary tools of an architect's mental workshop. I remember discussing, not many years ago, the subject of stage-craft with a dramatist, who not only stands at the head of his profession in America, but is held in sufficiently high esteem on this side of the Atlantic. "If," said he, "I were to come across an architect who also had taste and talent for literature, I should look to see a better play from him than from ten out of a dozen of our masters in fiction. Constructing a play," he added, "demands, I am convinced, a cognate mental faculty to that required for the planning of a house." One has only to apply this same rule to other branches of literature, in which, though construction may not be of such vital importance as it is to the playwright, it is yet by no means to be slighted, to see that the two arts touch at this point somewhat closely.

Again, somewhat similar limitations are imposed upon both author and architect as regards the medium in which they work. There is a language and grammar of architecture quite as complex and quite as conformable to tradition and general usage as the language and grammar by which the literary artist is, not so much fettered, as strengthened and sustained. The genius of the one, as of the other, is to be found in the skill and aptitude with which old and conventional symbols, some of them by force of association representing concrete or abstract ideas, others serving but as the means

whereby these ideas are linked together, are disposed in so novel and original a manner as to convey to us a new thought or a novel impression. And I may, perhaps, be permitted to parenthetically suggest at this point, that as by this time the dream which has deluded not only our own but other generations, the dream of a new and arbitrarily formed language to usurp the places of those diverse tongues which are undoubtedly a bar and hindrance to the universal exchange of thought, has proved itself to be but the fallacious confusing of the desirable with the possible, so that similar vision which, like a misleading but fair-appearing mirage, has mocked so many otherwise far-seeing and clear-thinking men, that will-o'-the-wisp, if I may be allowed the expression, of a "new architectural style" is destined to a corresponding dissipation under the mist-dispersing rays of reason. "Volapük," the latest of the universal language crazes, is no more ludicrous and abortive an attempt to override deep-seated traditions and conventions than is the essay to provide us with an entirely new order or style of architecture.

But there are other matters of technique wherein the two crafts closely approach one another, though they may, after all, be chiefly classed as subordinate rules of construction. One of the most perfect literary artists of our generation, considered simply as an artist, but one who, because she wrote nominally for young people has had denied to her by the unthinking public her due meed of praise in this respect, always declared that she owed much of her education in those matters of construction which have helped to render her masterpiece the perfectly cut and polished gem of literary art it is now admitted to be, to the latter part of the third letter in Ruskin's "Elements of Drawing," a treatise which is, perhaps, more familiar to you than Mrs. Ewing's "Jackanapes," the little book to which I refer. She clearly saw that the principles there laid down with regard to music, poetry, and painting applied to prose with at least as equal force as to architecture. I need not, to those who are so well versed in Ruskinism as yourselves, dwell upon that consummate literary artist's analyses of the Laws of Principality, Repetition, Continuity, Contrast, Harmony, and so forth, which are there to be found. I can only regret that those incomparable artistic stylists the French have seen the light in this respect so much more clearly than our own writers, and that, however much we may excel them in the imaginative aspect of our modern literature, we are obliged to admit that their constructive ability is of a far higher order. This, I take it, is chiefly due (and this is a point I cannot too strongly emphasise) to the more intimate relationship between the arts, to the better comprehension of the common principles underlying them, which in that nation exist. It is the old story emphasised by each successive "Salon" and each "Academy." We may have an excellent story, but we tell it in a slovenly manner; the French may have no story at all, but, if you will excuse the Hibernicism, they tell it remarkably well. This, however, is perhaps wandering a little too far afield, though, as I warned you when I began, I intended to explore any side-alley that should seem promising as I rambled down the main avenue of my subject.

Let me return for a moment to the application of Ruskinian theories to literature. I cannot do better, perhaps, than take as my concrete example the very story to which I have referred. In "Jackanapes'" the law of principality is clearly demonstrated. All the minor characters, touched in with loving fidelity, are yet grouped around the hero in such artistically subordinated a fashion as to cause us to feel that all they do, and say, and feel, serves but to increase the pre-eminence of the principal figure; they all conspire, as has been said by one before me, with one consent to reflect forth the glory and beauty of the noble, generous, recklessly brave, and gently tender, spirit of "Jackanapes." What aunt could fail to dote on such a boy? What village lad refrain from leaving his father's plough and following so inspiring an example to the field of honour? What brother-officer, however seared with sorrow and made taciturn by trial, could hold that dying hand, and not weep for him who begged for the grace of Christ and the love of God as he passed away?

The same story, too, is a good example of the values of the law of repetition and the law of contrast. With the rapid sweeping action of the human lives with which the story is concerned, are finely contrasted the eternal peace and quietude of the village-green; a quietude the abiding sense of which is gained by close attention to the law of repetition; over and over again in constantly, but unobtrusively, recurring sentences the picture of this peaceful old village-green is evoked, for, as Ruskin says, "In general throughout Nature, reflection and repetition are peaceful things."

I have endeavoured to briefly compare, or rather to suggest on what lines a comparison may be drawn between two arts at first glance as widely dissimilar as those we are considering, but have so far confined myself entirely to the actual technique. From such consideration it is not easy to see what practical advantage is to be gained by the student on either side, though perhaps, after due reflection, we may be enabled to recognise that even here material advantage is to be secured by the earnest and thoughtful. One takes a new point of sight from which to view the perspective, and though the lines converge according to the same formula in either case, a very different impression is often conveyed through the retina and optic nerves to the brain. Thus the very question of Principality is apt to assume a new meaning to us in our own art, when we see how it applies to, and the effect it produces in one apparently alien to us. This trick, if you care to apply to it no higher term, is one that has been learnt to perfection by some few architects, who, I fear, are but exceptions to the general rule; though, if we journey across the Atlantic, we shall find that it is the dominant note in the scheme of the American school. Last year I ventured to briefly draw attention to this fact, but upon that occasion I borrowed from the stock of current art terminology or slang, another phrase to express the same meaning. I referred then to the impressionism of much of what is best in Transatlantic architecture, by which, I said, I meant that quality or characteristic of a building which leads the spectator to carry away from it when he departs a more or less vivid impression of some one feature which so dominates the rest as to be thereafter primarily called into imaginative existence by the reminiscent faculties. It may be an entrance, or a gable, or a bay, or a chimney-stack, that is thus insisted upon, not necessarily to the detriment of other features, but to their semi-effacement. Is not this but another exemplification of an artistic truth dwelt upon with such insistent effect by all masters of literary style? The value of repetition, too, is one which is but dimly and sub-consciously recognised by the great mass of architects, though in literature, as has been shown with fine effect by Robert Louis Stevenson in the "Merry Men," for instance, and by Dickens perhaps to excess in nearly all his later novels, it has proved a veritable gold-mine of artistic effect. I need only refer to the Houses of Parliament as a striking example of the power of a countless repetition of details to produce, when employed by the hand of a true artist, and with a sense of the wide difference between this quality and that of mechanical triviality, an effect of reposeful and dignified quietude. Nor are these the only means whereby a study of a sister art may prove of indirect advantage to the architect. I have hinted already that those well-meaning but irrational individuals who persist in looking forward to that problematical millennium when we shall have evolved a new style, may take comfort in its non-appearance by reflecting that our Tennysons and Brownings, our Thackerays and George Eliots, our Carlyles and Ruskins, needed not nor even wished for a new language wherein to express the messages of originality and genius which they have delivered to our ears, and that the search for a new style in architecture is closely akin to the quest for a new language in literature. But, on the other hand, it must not be forgotten that those architects who are content to slavishly reproduce the models of the past, adapting them as little as may be to the requirements of the present, carry with them no message at all, save that of archæological investigation. They put themselves into the position of a poet who would convince us that not only is the language of Chaucer capable of neither extension nor improvement, but that it would be but truckling to the pervasive utilitarian and materialistic spirit of the age to endeavour to alter the exact sequence of ideas, which the Father of English poetry used the linguistic symbols of his time to convey. It is in the underlying sentiment, in the creative thought, clothed though they may be in conventional forms of speech, that true literary and poetic originality consists, and so it must always be with architecture. To be too conservative is as grave a fault as to be too iconoclastic. I remember when the fashion of the day,—healthy in the main, but, as all reactionary fashions are apt to be, not a little exaggerated by its votaries,—led us to turn back for our vocabulary to the earlier forms of our language, and to forsake the superabundant Latinity then prevalent, an enthusiast published a series of sermons in words of one syllable, and mainly of early English origin, to show how true eloquence might go hand-in-hand with absolute archaism. Well, it was exceedingly and cleverly interesting, but it was not literature; and so I venture to believe that a nineteenth-century building, whose chief title to favour is that a ghost of the thirteenth stumbling upon it by accident, between midnight and cock-crow, might be led to think the hand of time had somehow been turned back, and that he was in his own newly-built parish church, is neither more nor less than a deceptive study in archaism; it may indeed be archæology, but it is not architecture. Don't misunderstand me, I beg of you. I do not decry,—I should be the last in the world to decry,—that patient study, that sympathetic assimilation of the records of the past, which is one of the watchwords of our English architectural generation. I only wish to protest against the confusion of the means with the end, against the slavish worship of the word, accompanied by a blind indifference to the spirit which should inform the word; and here it is, in my estimation, that even the casual study of an art outside our own is likely to have a beneficial effect, for, once admitting that the premisses are the same in both, the *reductio ad absurdum* is more apparent in the one than in the other, and, therefore, more salutary.

But, gentlemen, literature has another relation to architecture, or, perhaps, I should say to architects. It is nearly a score of years now since I first entered an architect's office, the world is constantly moving, and so, doubtless, things are not what they used to be in regard to what I am about to touch upon. In my day, however, it was the exception rather than the rule to find an architect's pupil or assistant who was also well read in his own literature. There was much, doubtless, to excuse this in him. He worked at his office all day, and if he were earnest and industrious he spent a majority of his evenings over his drawing-board or his books of professional reference. Nowadays, perhaps, from what I gather, his leisure time is even more fully occupied with studies having direct bearing upon his profession, for examinations appear to be the chief end of architectural man, and we are fast rivalling, as devotees of the Competitive Cult, our almond-eyed friends the Chinese, who have headed us off by a few score centuries in this, as in so many other inventions of our newer civilisation. Let the cause have been what it might, the effect was one to be deplored, and unless things have altered very much for the better in this respect, one to be deplored fully as much in the 'nineties as in the 'seventies. Of all artists an architect is the better craftsman in direct ratio to the width and extent of his general knowledge. One can just barely conceive that a great painter may be ignorant of everything save of a technical knowledge of his craft and of an intuitive knowledge of human nature, but there is hardly a fragment of general information to be acquired, which may not at one time or another be of inestimable service to the architect in the direct line of his profession. The great genius, perhaps, who appears in a decade of centuries is, of course, superior to all rules and regulations, and is, to a certain extent, complete within himself, unless we adopt the meretricious diagnosis of genius as the gift of taking infinite pains. I am, however—and I trust in saying this I do not wound your self-esteem—I am, however, not speaking to a room-full of geniuses, but rather to a body of men of talent and artistic taste. To such I would say that it is at least necessary in my opinion for an architect to have an appreciation of the higher forms of literature as it is for him to be able to properly calculate the strain on an iron girder. Now, appreciation without familiar knowledge is a contradiction in terms, so that it is evident that a portion of the working day or night should be as sedulously set aside for the assimilation of general literature as for other more definitely and distinctly professional branches of study.

Our contemporary architecture suffers, more than from any other cause, from want of imaginative faculty, and I cannot accuse myself of riding a hobby to death if I maintain that this very want arises from that widespread indifference to imaginative literature, which is characteristic, not of the architect alone, I beg to say, but of the majority of our nominally well-educated and refined upper classes. Imagination is, beyond a certain point, more or less of a habit of mind, and, like all similar functions of the intellect, can be developed or retarded by circumstances and surroundings, quite exterior to, and independent of, itself. We may starve it, or we may feed it, and to carry the analogue a little further, we may stunt its development as effectually, by confining it to one species of food alone, as by depriving it of sustenance altogether. Thus, though the benefit may not be objectively apparent, you may quicken your capacity for original designing quite as successfully by reading and enjoying an act of "Hamlet," or one of "The Idylls of the King," as by committing to memory a chapter of Fergusson or a page or two of Gwilt. Nor, again, should it be forgotten that the narrowness of mind which is the inevitable consequence of an indifference to literature is of all intellectual faults most to be avoided by the architect who, by the very nature of his art, is bidden to enlarge to the very widest extent the horizon of his sympathetic appreciation. Without culture you can hardly hope for refinement, a lack of which quality in your work is, as you all know, one of the most detestable of faults.

And now, gentlemen, I have endeavoured, all too imperfectly I fear, to make clear to you to what degree Literature is the creditor of Architecture. But is there not a counter-claim, as law records have it? Is the balance all on one side? I hardly think so, though I must confess that, if the debt *per contra* has not been expressly repudiated, it has at least been but grudgingly acknowledged. If it had not been for the inherent poetry and mystic imagination, for instance, of Nôtre Dame de Paris, we should have never enjoyed what, from some points of view, is the masterpiece of that literary demi-god Victor Hugo, and Quasimodo and Esmeralda would for us have never been. To the same cause, though in a somewhat more indirect manner, those Wizardries of the North, the "Waverley Novels," owe their very existence, while how much of William Morris and of Rossetti, as we know them, is due to the influence of the late Gothic revival I leave you to judge for yourselves. I doubt, indeed, if much that is characteristic in Browning's later volumes is not due to the subtle influence of the sun-kissed, weather-stained marbles of the Italian Renaissance with which at various critical periods of his poet's life he was surrounded. Finally, there is no manner of doubt in my mind that literature has to thank architecture far more than architecture has to be grateful to literature for the gift of that master of melodious phrase, that great prose poet of the century, John Ruskin. It is architecture itself that the "Stones of Venice" and the "Seven Lamps" have to thank for their existence, and it grows with each year more clear to our eyes that, despite his marvellous rhetoric, despite his riotous wealth of eloquence, Ruskin has impressed the literature of his generation with a seal more enduring than that with which he has stamped its architecture. Ruskin apart, has any literature of an ennobling eloquence been devoted to the service of architecture? To my knowledge, at least, none. We have our Fergussons, our Parkers, our Guilts, but how little else? Trustworthy educational treatises, encyclopædic in style, even if absolutely reliable in fact, are but a poor return for literature to pay you for all she owes to your art. It is surely somewhat humiliating for us to consider that the majority of such architectural works as can claim to be really literature, and not mere samples of book-making, are, as the phrase goes, "made in France" or "in Germany," as the case may be, for we have, alas! no Viollet-le-Duc to adorn his subject with grace of manner and charm of diction, as well as to bring to it the treasured results of a lifetime of patient and laborious investigation. Even the books of that intermediary rank, which act as a sort of link between the professional man and the layman, are much fewer and farther between than should be the case in a country, the average level of whose literary culture is so high as that of England. Nor are the reasons for this difficult of recognition; the fault is not wholly upon one side or the other. It is only within the memory of the last generation that the great majority of architects have caused their own profession to be estimated by the outside world as worthy of that dignified position which is now universally accorded to it, while, on the other hand, outsiders have never felt, for they have never been taught to feel, an interest in architectural technique, comparable to that with which they have ever regarded the technical aspects of painting and sculpture. That something more than mere taste or general education is necessary to enable them to justly estimate an architectural creation, is a somewhat novel idea to the vast majority of the public. This indifferent, well-nigh contemptuous, attitude towards the art itself has reacted naturally enough upon its professors, and is curiously reflected in the attitude towards architects assumed by the practitioners of the art of fiction. An essay upon the appearance of the architect in fiction would be almost as brief as the celebrated chapter on "The Snakes in Ireland," and for the same reason. Dickens, however, whose portrait gallery is hung with the counterfeit presentments of representatives of nearly every trade which is to be found within the covers of the London Directory, has not forgotten the architect, and painfully suggestive too, is his method of treating our honoured profession. Mr. Pecksniff, as you will remember, is perhaps the most offensive of the amazingly offensive personages by whom the action of "Martin Chuzzlewit" is carried on; so offensive indeed is he, that he has been declared to be an altogether impossible personage. Certainly he is an absolutely impossible architect, and the ignorance displayed by the author of those details which would have helped to give *vraisemblance* and local colour, as it were to his creation, is little short of surprising. In introducing him to us, as you may remember, the author's remarks that "of his architectural doings, nothing was clearly known, except that he had never designed or built anything, but it was generally understood that his knowledge of the science was almost awful in its profoundity," and further that "Mr. Pecksniff's professional engagements indeed, were almost, if not entirely, confined to the reception of pupils; for the collection of rents, with which pursuit he occasionally varied and relieved his graver toils, can hardly be said to be a strictly architectural employment." And yet but a few pages farther on we find Mr. Pecksniff has evidently been invited to send in a set of competitive drawings for a new grammar-school. Not only does he do this, but he uses for that purpose a set of plans which had been drawn in the course of a very few days by young Martin Chuzzlewit, who, whatever his other valuable qualities may have been, was clearly as ignorant of the practice of architecture or of the principles of design as a new-born babe. And yet these plans are successful, and win the competition. More than this, Mr. Pecksniff, though bereft of the services of his only assistant, and himself engaged in non-professional affairs which take him here, there, and everywhere, somehow manages to prepare the working drawings, and to be present at the laying of the foundation stone by, as you will remember, "the member for the gentlemanly interest." After this, as far as the book is concerned, he ceases even to be nominally an architect, and (for no apparent reason) after he has finished his triumphant career as a hypocrite, becomes a mere begging-letter writer. The one redeeming quality which I can find in the character of this libel on an honourable profession, to whom I have already perhaps devoted too much of your time, is that he recognised the importance of literature to architecture. "Various books," he is reported to have observed upon one occasion, waving his hand towards the wall, "connected with our pursuit! I have scribbled myself, but I have not published."

That Thomas Hardy, the only other novelist of distinction who to my knowledge has made of an architect a seriously-considered character, should have displayed a more intimate knowledge of the subject is not so surprising as, at first glance, would appear, for, before he was a novelist, Mr. Hardy was himself an architect. Much as I admire those works of imagination, with which the distinguished biographer of Wessex folk has presented us, I am at times tempted to regret that he did not remain longer in his original profession, and use, in a measure at least, his literary gifts in her service. We might have lost "The Return of the Native," or even "Tess of the D'Urbervilles," but we should have gained that *lusus naturæ*,—a work of the highest degree of literary merit with the name of a real live architect upon its title-page.

Finally, a word must be given to the periodical literature of architecture, and here, I suppose, I am treading upon somewhat delicate ground. I think, though, that I voice the sentiments of some of you at least, when I declare that ideal provision has not yet been made for us in that respect. Year by year the architectural profession is counting upon its rolls fewer who look upon it as a mere business, and more who regard it as a sacred art. The paths of the contractor and the architect daily diverge more and more, and, though I have no words save of praise for those organs which, at present, represent so worthily the entire community which depends upon the art of building, I do not think that the ideal architectural paper is yet in existence. It will, as I conceive it, when if ever it does arise, concern itself not with architecture alone, but with all those subsidiary arts which she has enlisted in her service, and with those artistic crafts which are subordinate only because they differ in degree and not in kind. It will be, from its inherent interest, the medium which shall bridge over the chasm which now seems to cut off so effectually the architect from the general community, a chasm the existence of which is due only to the hereditary ignorance of the latter, and the hesitation of the former to assume that position which, in the empire of art, is his inalienable right. It will be a model of all that the representative of artists should be, in regard to its printing and its illustration, while in its pages will be found that perfection of literature which is only possible when the men who write concerning an art, of whose principles they are thoroughly cognisant, are also thoroughly informed with the principles of the literary art itself, and have recognised that the two are one and indivisible.

And now, gentlemen, conscious of having trespassed somewhat unduly upon your good-nature and of having taxed beyond the bounds of due discretion your patience, I can, as my excuse, find nothing better to bring forward than the mention of the fact that Literature and Architecture are arts in which I am equally interested, and to which I owe an equal share of my allegiance. I warned you when I began, that of practical suggestion I should have but little to offer you, and I fear that I have only too well fulfilled my prophecy. But, after all, I may be fortunate enough to be wrong in this gloomy surmise; perhaps, weak and halting as has been my utterance, loosely knit as have been my arguments, random and fortuitous as have been my illustrations, I may yet have added one poor stone to the great House of Art we are all of us, in our several ways, helping to build. You know how the violinist, standing by an open piano and idly drawing his bow across the strings of his own instrument, strikes every now and then a note to which responsive echo is made by the silent strings beside him; so perchance at intervals to-night I have unconsciously touched some chord which may in either your hearts or your brains have set some responsive string vibrating in harmonious accord.

If this be so, and if the memory of those pulsations remains with you even for a little while, my time or yours has not been wholly mis-spent. Let me then, while thanking you for the attention, far beyond my merits, with which you have listened to me, urge on you once more the consideration of what, in my own mind, I have dimly recognized as the text from which to night I have been preaching; that art, namely, is one and indivisible and that he who would be pre-eminent in one must not be absolutely without rank or recognition in the others; that from the architect, as from no other artist, there is required a catholicity of sympathy with all that is great and ennobling in human life; that, with Terence, you ought each one of you to declare that "*Homo sum; humani nihil a me alienum puto.*" "I am an architect, and nothing that belongs to man do I regard as insignificant to me," as we may not unaptly phrase it. How then can you fail to take into your communion that art which is the link between all others, without which we should still be sunk in the apathetic ignorance of the middle ages (for it must not be forgotten that it was the Revival of Learning in Italy which made possible the Renaissance of Art); how, in short, unless you are servitors of literature, can you aspire to be Masters of Architecture?

Looking at the matter from the narrowest and most direct view, the study of literature is necessarily enjoined upon you, for the meaning of the architecture of the past can hardly be clear to us until we have a clear conception of the conditions which prevailed when each particular style was in process of formation. To those who are ignorant of what manner of people that wonderful handful of the human race were, who leavened the whole mass of the world's posterity with the vital germs of all the arts, the shattered fragments which strew the abrupt Acropolis must speak but haltingly or in an unknown tongue; to those who have not appreciated the more material supremacy exercised by those ethnical prototypes of our own nation, who held a score of centuries ago the empire of the world, the arches and the columns of the City by the Tiber must be bereft of half their meaning; to those who have not studied that unutterably awful spectacle presented to us by the nightmare-like gloom which overspread society in mediæval Europe, the long-drawn aisles and fretted vaults of the Gothic cathedrals must lose no little of their sad suggestiveness; while to those who are unwitting of the passions and the transports, the sickening vices and the moral excellences of fifteenth-century Italy, the legacy it has left to us of such surpassing beauty and symmetrical grace must be as a sealed book. Here again our only guide is literature, and with her to aid you, you can clothe again those dried skeletons of the past with fair-seeming flesh and make them speak to you, when to others they would preserve but a Sphinx-like silence, the message of art which which it is theirs to deliver, and yours to interpret to your own time and your own people.

In the discussion which followed,

Mr. W. Burrell said he had much pleasure in proposing a vote of thanks to Mr. Townsend for his paper, which had been one of great interest and suggestiveness. Such papers as that lifted them out of the turmoil in which they were generally engaged. Usually, papers read before them dealt with some more or less technical matter relating to the science of construction, but on the present occasion they had had a literary treat which would be, he thought, very wholesome for them, for Mr. Townsend's paper had served to show them that there were more things in heaven and earth than were embraced in their Curriculum. As a matter of course, the list of things which they had to learn as architects could not include everything which was necessary to make them men of culture, although the study of literature was one of the most important aids to that end. Mr. Townsend, as one who had himself practised as an architect, and who was now engaged in literary work, thoroughly understood how to treat his subject from their point of view. Until he (the speaker) had heard Mr. Townsend's paper that evening, he had not thought that there was so close a connexion between the art of the architect and that of the playwright as the gentleman in America, to whom Mr. Townsend had referred, seemed to think. As to the little book mentioned by Mr. Townsend, entitled "Jackanapes," he (the speaker) had read it and had been very much interested in it; but the statement made by Mr. Townsend that Mr. Ruskin's "Elements of Drawing" had anything to do with it quite astonished him. He was hardly prepared to agree with Mr. Townsend that Dickens had altogether misrepresented the architectural profession in his portrayal of Mr. Pecksniff. He did not think that Dickens meant to portray anyone but Mr. Pecksniff himself; but, nevertheless, he (the speaker) was bound to say that there were still to be found in the profession some gentlemen who were not wholly devoid of some of Mr. Pecksniff's peculiarities. As to the improbability of Dickens's story about the competition designs for a grammar-school having been gained by a young and inexperienced man, well, they all new that grammar-schools and other buildings were won in competition, even under present conditions, by young gentlemen who did not know much about the architectural profession. He had much pleasure in proposing a vote of thanks to Mr. Townsend.

Mr. A. H. Clark, in seconding the vote of thanks to Mr. Townsend, said his paper was a very difficult one to follow in discussion. There seemed to be only one thing that could be found fault with in the paper, and that was Mr. Townsend's excess of modesty; but the members of the Association had a far higher opinion of Mr. Townsend's merits than he himself entertained. Amongst the whole phalanx of truisms to which he had adverted there was none which struck him (the speaker) so much as that concerning the light that literature was able to throw upon old buildings. No one could visit old buildings without feeling that their interest was doubled and trebled if they had been the theme of some of the celebrated writers. With regard to what Mr. Townsend had said in reference to the Renaissance and the parallel which he had drawn between the literature and architecture of that time, it always seemed to him (the speaker) that the Renaissance poets, or the poets who wrote just about the time that the Renaissance architecture was coming to the front, possessed a distinct flavour of the old Roman poets,—so much so, that in reading some of the Renaissance poets one really seemed, so far as style was concerned, to be reading translations of Virgil. Mr. Townsend had briefly referred to a subject which might, perhaps, with advantage have been more fully treated in his paper, viz.: the relation of modern current literature to architecture. Literature owed a very great debt to architecture, although it did not seem to be at all adequately recognised. The public, in their estimation of architecture, would always be led, to some extent, by current literature and by the press; but he very much regretted that in the present day the press showed such callous indifference to architecture, such an ignorance of its details, and such a want of appreciation of good work by the best architects of the day. In proof of that, one had only to read those garbled accounts of great public buildings which appeared in the daily papers. It was a regrettable fact that while other artistic subjects were treated with due attention, architecture received such meagre treatment; because there was so large a portion of the public who were unable to form their own opinions, or whose opinions, when formed, were not worth anything, and they were ready to lean on the current literature of the day, particularly on the press, and not only to adopt the opinions expressed in the public prints, but to repeat them to their friends. He thought that if architecture were represented in the way it ought to be by the press, the effect on the general public would be very beneficial.

Mr. E. H. Sim supported the vote of thanks. Of course he quite agreed with the general spirit of the paper, but he was afraid that an acquaintance with the story of "Jackanapes" on the part of an architect would not be so good a recommendation to a client as a knowledge of the price of brickwork. He quite agreed that architecture in the present day was very much overlooked by the press. In the descriptions of new buildings which appeared in the general press, the architect's name was hardly ever mentioned.

Mr. J. C. Stockdale remarked that although it was no doubt true that an acquaintance with the story of "Jackanapes" or any other literary work would not teach a man how to draw a moulding, it should be remembered that imagination played a most important part in architecture. There was no doubt that imagination was of supreme importance to the architect, and that much of the work which now appeared so unsightly would have been improved had the architect drawn his work with a greater amount of feeling and refinement, and that was only to be obtained by a study of literature.

Mr. F. T. W. Goldsmith said he desired to support the vote of thanks to Mr. Townsend, whose paper had not only been of great literary merit, but had treated the subject most comprehensively. Without question, the wider and more extensive the knowledge possessed by architects of the present day, the better it would be for architecture. So long as the architect was confined to one groove of reading, his work (as affected by such reading) would be biased. He was very glad to hear Mr. Townsend refer to the influence of the imagination on architecture. Mr. Stockdale had alluded to an eminent politician (Mr. Goschen, he believed), who had not long ago discoursed on the uses of imagination. Mr. Goschen himself was a man who combined, in a singular degree, a practical, hard-headed knowledge of the world, with the imaginative faculty. He did not think that any architect, with any pretentions to literary taste, could fail to have his work influenced by every book, or even chapter of a book, which he read during the working out of his design. For instance, if the building to be designed had some poetic purpose to serve, and if its architect were studying at the time some eminently unimaginative book, the practical work which he was reading would have a direct and subtle influence on the general conception of the design and its details. On the contrary, if he allowed his mind to become imbued with the fine imaginings of some great poet through the reading of some distinctly poetic works (not necessarily in rhyme, but such works as those of Mr. Ruskin's, which were emphatically the great poetic works of the age), his design would be brought under such poetic influences, in such a manner as would not, perhaps, be felt by himself, but which would be impressed on every feature of the work. He thought that Mr. Townsend had good reason for the deduction that the literary tendency of architects was in the direction of dramatic rather than in purely literary taste.

Mr. Houston said he thought there was some analogy between what was called the "New Journalism" and the bad architecture that one saw at the present day in Shaftesbury-avenue and elsewhere.

The President, in putting the motion, said he supposed that the analogy, or some of the analogies, between literature and architecture could not have escaped any thinking architect; at the same time he thought it was the first time that the subject had been treated in a paper before them. He thought that some of the analogies referred to by Mr. Townsend were fairly apparent. They were quite accustomed to call the styles of architecture languages, or to use words having that significance. The more one looked into it, the more one saw that what we called styles were languages of which it was necessary to learn the grammar before one could compose in them. He thought there was some little confusion sometimes in the present day between learning the grammar of a style and executing a building in a particular style; it seemed to him that they were two very different things. It seemed to him very useful to learn what other people had done,—to learn the grammar of the old styles,—but it was a very foolish thing to copy old work exactly. The President, in conclusion, said he should like to add his own personal thanks to Mr. Townsend for his paper, which had given them all a great deal of food for reflection, and he had great pleasure in putting the vote of thanks to the meeting.

The vote of thanks was then put and carried by acclamation.

Mr. Townsend, in acknowledgment, replied to some of the points raised in the discussion. In reference to Mr. Burrell's criticisms on what he had said with regard to Mr. Pecksniff, he (Mr. Townsend) was perfectly aware of the fact that many pupils and many assistants did design grammar schools, or buildings of a similar kind, on the foundation stones of which other men's names were placed; but he had never heard of a pupil of three days' duration who was able to make a successful set of competition plans. He merely referred to that point as showing in a very striking way how Dickens, who took such immense pains in his work, even spending days in tramping over London in order to find a suitable name for one of his characters, seemed to have regarded an architect as a man of so low a grade that it was not worth the trouble of making the least inquiry,—which he could easily have done,—as to how he carried on his profession. On the other hand, with regard to his medical and legal characters, Dickens seemed to have taken the greatest pains to be accurate.

GOOD FRIDAY WEEK.—Next week we go to press a day earlier than usual. All communications for the Editor should reach him by *first post on Wednesday morning;* but lists of tenders will be received up to 12 noon of the same day.

THE BEXLEY SYSTEM OF EMPTYING CESSPOOLS.—This system, which we described in detail in the *Builder* for June 13 last year, is becoming increasingly used. Mr. Boulter, the Surveyor of the Local Board of Bexley, informs us that he has now dealt with 700 cesspools without the least of complaint. The Public Health London Act 1891 has been the means of the introduction of the system within the metropolitan area, the Plumstead Board using it both in Plumstead and Eltham. Since we described the system, it has been adopted at Gravesend, Chatham, Richmond, Staines, Enfield, and Chichester; and it is in contemplation to introduce it at Dunstable.

Illustrations.

ILLUSTRATIONS OF OLD CHESTER.*

IV.—SUPPORTS OF BISHOP LLOYD'S PALACE.

THE drawing shows the boldly-designed story-posts which support the overhanging portion of the old house called "Bishop Lloyd's Palace" in Watergate-row. They appear on a small scale in the marginal sketch appended to the general view of Watergate-street published in the *Builder* of February 27.

INTERIOR, NORWICH CATHEDRAL, AND EAST END OF CHOIR, ELY.

THESE two illustrations are reproduced from two beautifully-executed pencil sketches by Mr. S. K. Greenslade. The exterior of the choir at Ely is one which he kindly placed at our disposal for illustrating Ely Cathedral, but as there was nothing to balance it well among the other Ely drawings, we preferred to give it this week along with the interior of the crossing at Norwich.

The two form interesting examples, in very different ways, of the solidity and monumental character of the earlier forms of Mediæval architecture. In spite of the large amount of window area in the east end of Ely, the massive yet gracefully decorated flanking buttresses give the effect of ample strength and stability, further emphasised by the massive buttresses and pinnacles at the angles of the aisles.

DESIGN FOR A STEEPLE.

THIS is the design, by Mr. T. Rogers Kitsell, for which the Tite prize was awarded this year by the Institute of Architects. The design fulfils the conditions of the bequest, which was to promote the study of Italian or Renaissance architecture, and the design is graceful and satisfactory, if not showing any very new or original features. The treatment of the spire at its junction with the tower is elegant, the curved lines at the base giving lightness and play of line in a manner in keeping with the style. We may suggest that the balustrade over the cornice is in the wrong place. It forms a fence to an inaccessible corner where no one would ever require a fence; whereas the section will show that the window opening, which comes right down to the floor under the spire, is left entirely unprotected. Balustrades have come to be very much a conventional ornament, but they should be placed where there is most semblance of use for them.

ROTHERHITHE INFIRMARY, ST. OLAVE'S UNION.

OUR illustration shows the additions and enlargement recently carried out at the Rotherhithe Infirmary, for the Guardians of St. Olave's Union, and opened by the Chairman of the Board, Augustus Scovell, Esq., on December 16 last.

The new portions of the building are shown in black, the hatched portions showing the building as erected in 1873 by Mr. Snell. The additional accommodation provided consists of a new male block with separation-wards, day-rooms, and duty-rooms for 177 inmates. New female block for 96 inmates; nurses' home for 40 nurses. The enlargement of the laundry, kitchen, receiving-wards, new officer's mess-room, and new dead-house and *post-mortem* room.

The wards are 88 ft. long, 24 ft. wide, and 13 ft. high, and contain twenty-eight beds each, and at the end, separated by disconnecting corridors, are the bath-rooms, lavatories, and w.c.'s. In the disconnecting corridors are the fire-escape doors, which lead on to the escape staircases. The heating is carried out by hot water, and by central hot-air stoves, with vertical flues, which, with the flues provided in the external walls, carry off the vitiated air; the fresh-air inlets are fixed in the external walls, and communicate with the boxes covering the hot-water pipes. In the centre of each block are the day-rooms, duty-rooms, and separation-wards, and the new buildings are connected up with the old by open corridors.

The buildings have been carried out from the designs of the architects, Messrs. Newman & Newman, of 31, Tooley-street, London Bridge, by Mr. J. O. Richardson, of Albert Works, Peckham. The clerk of works was Mr. William Gannaway, and Mr. C. W. Read, the contractor's foreman. The engineering works were carried out by Messrs. Clements, Jeakes, & Co., of Great Russell-street; the lifts by Messrs. Waygood; the sanitary works by Messrs. Tylor & Son and Mr. M. Syer; and the heating by Messrs. Clements, Jeakes, & Co. and Mr. John Grundy. The amount of the contract was 30,857*l*.

* For preceding views of this series, see *Builder* for February 6, February 27, and March 12 last.

MAGAZINES AND REVIEWS.

The *Gazette des Beaux-Arts* includes an article on Opie by Mr. Claude Phillips, giving a fair summary of the painter's merits and defects, with perhaps rather an undue exaltation of the former. We presume French art magazines are about to "discover" Opie as they have "discovered" Lawrence. M. Salomon Reinach contributes a paper on the "Musée des Antiques à Vienne," which he praises as one that in the matter of installation can fear no comparison with any similar establishment in Europe; he also draws attention to the excellent arrangement and editing of the catalogues and guides. Illustrations are given of some of the most remarkable fragments of antique sculpture in the Museum. M. Marcel Reymond endeavours to show that one or two pictures attributed to Raphael are really the works of Cesare de Sesto. M. de Fourcaud gives the second part of a communication on "L'Art Gothique," in which he sums up with the conclusion that the heart and soul of Gothic art is to be found in France, and speaks (naturally enough) with approval of the work on Gothic architecture by Mr. Moore, whom he refers to as "un savant Anglais." French critics should really distinguish between English and American writers; Mr. Moore's book is one that no Englishman would care to own to.

The *Art Journal* gives the second of a series of articles under the title "Outings in India," dealing with Poona and its neighbourhood, and including among its illustrations a reproduction of a photograph "On the River Moota-Moola" giving a remarkably real effect of strong sunlight. The article on "Paris Pleasure Resorts" continues the illustrations of the Marne, and Mr. J. F. Boyes contributes an article on Sir A. H. Layard. Mr. Aymer Vallance's article on the decoration of the house (No. 4) deals with "Furniture," giving some illustrations of furniture which are unexceptionable in taste and refinement of design.

The *Magazine of Art* illustrates a short article on Mr. Stanhope Forbes by reproductions from his two best works, "The Health of the Bride" and "By Order of the Court." The paper on "Artistic Homes" is this month on "Wall-papers," by Mr. Lewis F. Day, and gives some illustrations of mostly fine designs, of which the most original is what is called a "Tile-paper," we presume from its being designed after the manner of tiles; it is said to be designed by "Arthur & Co." Why does not the *Magazine of Art* insist on the real name of the designer being given, instead of the name of a firm? A "company" cannot make a design; it can only sell it when made. Other articles are on Sir George Reid, the President of the Royal Scottish Academy; on "Painter-etching"; and on "The Art Treasures of the Comédie-Française," giving some exceedingly interesting illustrations.

The *Fortnightly Review* contains an article by Sir Robert Ball, "How Long can the Earth sustain Life?" to which some persons, not conversant with the proportions of cosmic time, will possibly turn with some anxiety to find out the probable fate of their immediate descendants, and will be relieved at finding that four million years is the smallest period promised, and that it may be extended to ten million. Considering what an immense space even the period of about four thousand years of human life of which we have anything like historic knowledge appears to us, we may well regard Sir Robert Ball's few million of years as further, at all events, than we can think to the end of; although there is a distinct difference to the mind, no doubt, in regarding the habitable state of the earth as necessarily to terminate within a period calculable on definite data. The data, of course, are the considerations as to the rate of waste of the sun's heat. As long as the sun remains in a gaseous state, it may lose heat, accompanied by shrinkage, without losing temperature; but when once it begins to solidify, then loss of heat means loss of temperature, with no replenishment. So physicists understand it now; and as far as they have got there is no great probability that the conclusions are wrong. Sir R. Ball even suggests as a probability that the dark bodies in the stellar system are more numerous than the luminous ones; that luminosity is but a temporary stage. So stupendous to the human mind, however, are the intervals of time involved, that one thinks rather of the positive than the negative results. If knowledge "grow from more to more," what may not the human intellect have achieved after even a million years from now? So vast are the considerations involved, that one turns with a smile to Mr. Walter Sickert's hysterical splutter about Whistler's pictures in the same number; the "Nocturne in Blue and Silver—Bognor," that is an "immortal canvas," and the man that created it "thereby alone immortal a thousand times over." Poor little paint-pot of a day!

The *Nineteenth Century* contains a well-written article by Sir Henry Wood on "Chicago and its Exhibition," the object of which is partly to reconcile Englishmen with a city which has been painted recently in no very attractive light. From his official connexion with the Exhibition Sir Henry no doubt must be taken rather as an advocate than a judicial critic, but he presents the Exhibition side of the case in an able and persuasive manner.

The *Atlantic Monthly* contains "Some notes on French Impressionism," by Miss Cecilia Warren, serving up again the old argument that the eye cannot rest simultaneously on two things, consequently that "a more open-air impression" is conveyed by a painting which shows only one object distinctly and leaves the rest a blur. It seems to be forgotten by those who use this curious argument that the eye looks from point to point of the picture as it looks from point to point of the real landscape, and has a right to expect some recognisable form in all parts of the painting; not to say that the principle involves the quiet assumption that the world of landscape-painting has been wrong up to the present generation. The article is well written and contains some good criticism in detail.

Scribner's contains an article on the "New Parks of the City of New York," referring to parks laid out in pursuance of an Act passed in 1883, appointing a Commission to secure new parks beyond the Harlem River. The land for three large and three small parks was purchased at a cost of 9,000,000 dollars, after much opposition from economists who objected to the outlay. The large parks referred to are the Pelham, Bronx, and Van Cortlandt Parks, of which some sketches are given, looking very much like park scenery all over the world. There appear to be some interesting old houses on the estates, which have been preserved. The same number contains an article on "Charles Keene of *Punch*," by Mr. G. Somes Layard, written both with enthusiasm and judgment, and including a letter addressed to Keene in 1883 by a Dutch admirer, which in itself is worth getting the number for, on account of its delightful mingling of true enthusiasm with naïveté and broken English.

The *Century* contains a long and carefully-considered article by Mr. Edward Robinson on the question, "Did the Greeks paint their sculptures?" going pretty fully into the at present attainable evidence, and concluding that the Greeks probably painted their sculpture fully and strongly; if not realistically, at least as near to realism in flesh tint and colour of draperies as the slightly conventional treatment of the sculptured form is to the natural form. This can hardly be proved to be the case, but we think the available evidence points very strongly in that direction. All we can say is, so much the worse for the æsthetic perception of the Greeks, which must have been less immaculate than was once supposed. We may observe that Mr. Robinson makes the same observation which Mr. Statham made not long since at a discussion at the Institute on the relations of sculpture and architecture, viz.: that the frieze of the Parthenon (the *cella* frieze) was placed in such a position that "much of the labour spent upon its execution was in vain." Mr. Robinson uses this as an argument in favour of strong polychromy, which alone could have made the sculpture intelligible in the position in which it was placed. The same number of the *Century* contains an interesting paper by Mr. E. S. Holden on "The Total Solar Eclipses of 1889," with illustrative diagrams. An article on "Our Common Roads" (meaning we suppose what we call High Roads in England), by Mr.

Isaac B. Potter, serves to show by its illustrations of the state of main roads in the vicinity of great American cities, how discreditably careless and behind the age is the United States civilisation in the matter of the maintenance of roads. Some of the illustrations (apparently taken from photographs) show a state of things almost incredible to an English road surveyor.

Harper's Magazine contains an article on Shakespeare's *Tempest*, or apropos of a French criticism of the play, by Mr. Andrew Lang, with a number of illustrations by Mr. E. A. Abbey. The article suggests some new critical ideas which are worth attention, but we cannot say the same of Mr. Abbey's illustrations, which appear to us singularly poor and weak in conception, except perhaps the one representing Trinculo's first encounter with Caliban. Mr. F. D. Millet's series of articles "From the Black Forest to the Black Sea, continues," and is illustrated by capital sketches of figures and bits of landscape and buildings. Mr. Julian Ralph's article on "Western Modes of City Management" is rather political than municipal, to the perception of an English reader, but is not without interest. A short poem, "In a London Street," may interest English readers as an instance of the fascination which our great smoky capital exercises on some minds.

The *English Illustrated* has an article by Miss Rose G. Kingsley on "A Hampshire Moor," with illustrations by Mr. Alfred Parsons; and "A Look Round Swindon Works," by Mr. A. H. Malan, with illustrations from the workshops. It is a pity the magazine should have admitted such nonsense as "A Middy Hero," of which it is difficult to say whether the illustrations or the text are the more absurd.

The *Antiquary*, in its notes of the month, remarks that "the regularity with which we have to chronicle complete or partial destruction of ancient churches through fire caused by faulty heating flues becomes almost monotonous. This time it is the old parish church of St. Nicholas, Rochester." Some stained-glass windows, a good deal of the roof, and the organ were destroyed; and the *Antiquary* probably does not exaggerate in regard to the frequency of this kind mischief from heating-flues. Among special papers are the conclusion of a series on "Prehistoric Rome," by Dr. Isaac Taylor; one on Norwich Castle by Mr. Mottram; and the third of Dr. Halbherr's papers on "Researches in Crete."

Temple Bar gives the conclusion of an article on B. R. Haydon, chiefly written, as the writer observes, "to direct some sympathetic attention to a very human document," viz., Haydon's autobiography, a book which certainly ought not to pass out of notice.

In the *Cornhill Magazine* the only noticeable article from our point of view is one on "Early Railway Travelling," which gives some details as to the conditions of railway travelling in the earlier days of the art, serving to show what a rude performance it was in comparison with the speed and comfort of modern railway travelling.

The *Revue Scientifique* contains an article on trans-continental railways of South America, by M. Daniel Bellet, giving among other things some account of the proposed railway across the Andes, a bold undertaking, which however will probably be carried out, and which among other results "will bring Valparaiso ten days nearer to Europe."

THE ENGLISH IRON TRADE.—Unfortunately, there is no change to record in the depressed condition of the English iron and allied trades, and the near approach of the holidays prevents any hope of amelioration. From all the pig-iron centres complaints as to the stagnation in business continue to be received. The prolongation of the Durham coal strike has caused a decrease of 85,136 tons in the production of pig-iron in the Cleveland districts, and a reduction of seventy in the number of furnaces in blast. Stocks have been drawn upon to the extent of 43,659 tons; but despite this fact the price has fallen 9d. per ton during the week. The Scotch warrant market is practically lifeless. Manufactured iron is very quiet, and a further weakening of prices is manifested. The tin plate trade shows no change, and the steel trade is dull. Many of the engineers who have been on strike in the Tyne districts are returning to work, but engineering establishments are slack. Ship-building yards are only moderately engaged. The coal trade generally shows little movement, and prices exhibit a certain amount of fluctuation.—*Iron.*

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

NEWINGTON WEIGHTS AND MEASURES OFFICES.

THE members of the Architectural Association had the opportunity on Saturday last of inspecting the first public testing offices for weights and measures erected in London by the County Council, and a large number availed themselves of the opportunity. The visitors were met by Mr. Spicer and several officers of the London County Council, who explained the purport and working of the various features of the establishment. The plan consists of a good-sized courtyard, with weighbridge, and on one side stabling and coachhouse for the various travelling inspectors; on the other, a weighing-room, treated like a hall, with open-timbered roof, and used for testing the ordinary weights and lineal measures of every-day use in ordinary trades. Beyond this are a room for the examination of jewellers' and apothecaries' weights with balances of various degrees of delicacy, and standard weights from the cental to $\frac{1}{100}$ grain, and beyond this room again, another with exceptionally good light for the testing of measures of capacity, both dry and liquid. Amongst the interesting features of this room are the sandblast machine for marking glass measures of approved fidelity, and various old standard measures of the counties of Kent and Surrey. A vote of thanks to their hosts by Mr. F. T. W. Goldsmith, the honorary secretary, concluded the reception, and the members then proceeded to the second portion of their visit, after remarking on the advance made in the matter of design shown in these buildings beyond the average level of official architecture.

ROYAL SOUTH LONDON OPHTHALMIC HOSPITAL.

The members subsequently visited the new South London Ophthalmic Hospital, designed by Mr. Keith D. Young, with the co-operation and direction of Professor McHardy. It occupies a site on the north-west of St. George's-circus, which, though admirably situated as a house of relief for the sufferers of South London, must have presented considerable difficulties to the designers in scheming the arrangements of the hospital. Professor McHardy met the members, and, in his own attractive and inimitable manner, conducted them over the building, and explained the details of the construction and fitting of the hospital, so that no doubt could exist in the minds of the visitors that careful attention and forethought had been lavishly expended by the doctor and the architect on all the minutiæ of the building, a description of which we hold over until next week.

THE LONDON COUNTY COUNCIL.

The usual weekly meeting of this Council was held on Tuesday afternoon at Spring-gardens, the Chairman, Lord Rosebery, presiding.

The Deputy-Chairman's Salary.—Another futile attempt was made, on the motion of Mr. Elliott, to rescind the resolution of November 7, 1889, fixing the Deputy-Chairman's salary at £1,500. The motion was lost by 64 votes against to 44 votes for,—a majority of 20 against.

The Water Question.—On the recommendation of the General Purposes Committee, it was resolved:—

"That the following be the order of reference to the Special Water Committee:—

The Committee shall prosecute and conduct all needful inquiries and negotiations relative to the supply of water or to companies supplying water in or near London, and shall consider the steps to be taken for acquiring the undertakings now supplying London or for providing a new supply.

The Committee shall conduct any negotiations with the water companies for purchase or otherwise which may be authorised by the Council.

The Committee shall take the necessary steps for the purpose of promoting and conducting conjointly with the Corporation of London the Water Bill of the Council.

The Committee shall conduct the case of the Council before the Royal Commission appointed to inquire into the subject of the London water supply."

The Proposed Amendment of the Building Acts.—The Building Act Committee reported for the information of the Council, that they had appointed a Sub-Committee to consider as to the amendment of the existing Building Acts, and as to other matters, such Committee to consist of the Vice-Chairman of the Council, the Chairman of the Committee, and Messrs. G. B. Holmes, J. Marsland, A. C. Ranyard, R. Roberts, L. Stevens, R. Strong, and H. R. Taylor.

Contracts for Lime.—The Main Drainage Committee, referring to a report which they made to the Council on the 1st ult., on the subject of the tenders for lime, now reported that they had received a letter from Messrs. C. Christopherson & Co., asking that they might be permitted to supply 2,000 additional tons, which they offered to do at 16s. per ton, being the same price as had already been accepted by the Council for 2,000 tons of lime. The Committee recommended—

"That, subject to an estimate being submitted to the Council by the Finance Committee as required by the statute, the offer of Messrs. C. Christopherson & Co. to supply 2,000 tons of lime at 16s. per ton be accepted, and that the Solicitor be instructed to prepare the contract."

An amendment that the recommendation be referred back, with instructions to the Committee to re-advertise for tenders, was moved by Mr. Goodman and seconded by Mr. Leon, but it only found 16 supporters, and the recommendation was agreed to.

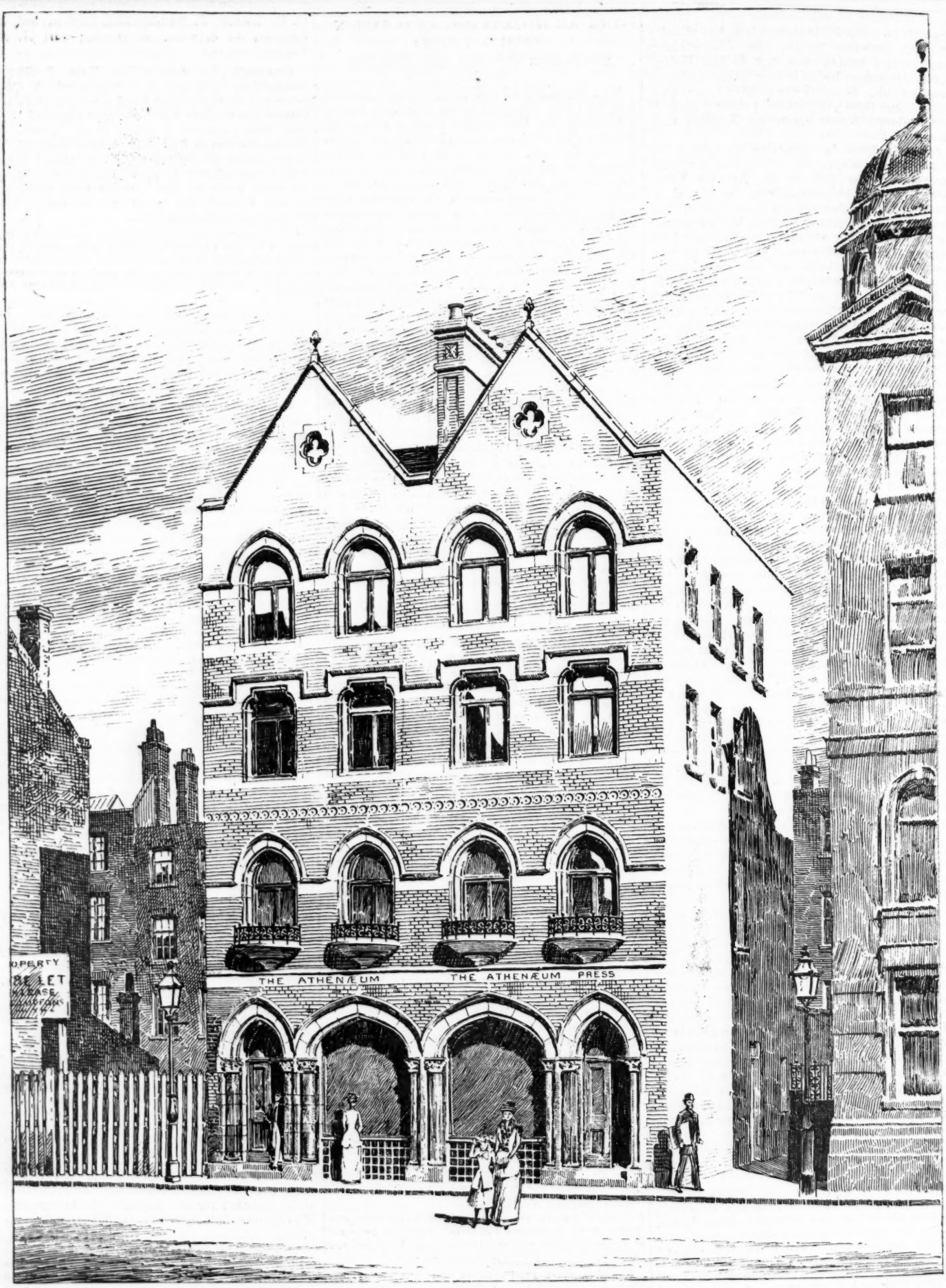
The Brook-street, Limehouse, Scheme.—The Public Health and Housing Committee's Report contained the following paragraph and recommendation:—

"The Brook-street, Limehouse, area comprises two plots of land cleared under a scheme confirmed by Parliament in 1883. The land was advertised for sale by the late Board in 1887, for the erection of artisans' dwellings to re-house 562 persons, but without result. In March, 1890, application was made to the Secretary of State for his consent to a reduction (viz., from 562 to 281) of the number of persons to be re-housed on the area, such reduced number to be accommodated in buildings to be erected on plot 1, and for permission to devote plot 2, which measures only 20 yards in width by 50 in length, to the purpose of an open space. The Secretary of State declined to sanction the reduction, suggesting that as a tentative measure the Council should again advertise plot 1, with the condition of re-housing 281 persons, the disposal of plot 2 being left for future consideration. Accordingly, plot 1 was offered for sale by auction on July 17, 1890, and again on March 24, 1891, but in each case without result. It was thought that the failure to find a purchaser might be due to there being no demand in the neighbourhood for block dwellings, and the Council therefore decided to make application to the Secretary of State, requesting him to sanction the reduction of the number of persons to be re-housed under the scheme to 281, on condition that both plots were used for the erection of cottage dwellings. The sanction of the Secretary of State was obtained to this proposal in due course, and the land was again put up for sale on the 23rd ult. on the altered conditions, but again to no purpose, no offers being made. Taking into consideration the fact that the plots have been put up by the Council four times for sale without result, and that an improvement scheme under Part II. of the Housing of the Working Classes Act, 1890, is now being proceeded with close to the area, with a consequent displacement of persons of the working classes, we are of opinion that a duty is cast upon the Council to see that the erection of dwellings is no longer delayed, and to this end that the Council should itself undertake to erect dwellings on the plots in question. The Housing of the Working Classes Act fully contemplates the possible necessity of the Council itself undertaking building in connexion with an improvement scheme, but provides (1) that the consent of the Home Secretary shall be first obtained, and (2) that the dwellings when erected shall be sold within ten years of completion, unless the Home Secretary otherwise determines. The first step, therefore, is to obtain the consent referred to, and if this is given, to cause proper specifications and estimates to be prepared for the approval of the Council. The recommendation we make at this moment is—

'That application be made to the Home Secretary under section 12 (3) and (5) of the Housing of the Working Classes Act, 1890, for permission for the Council to erect cottage dwellings on the vacant plots on the Brook-street site, in general accordance with the plans which have already been approved by him, and that if such application be granted, proper specifications and estimates be prepared and submitted to the Council.'"

The recommendation was agreed to, and after transacting other business the Council adjourned.

ROBERT BOYLE & SON (LIMITED).—We are informed that the Directors of Robert Boyle & Son (Limited), ventilating engineers, London and Glasgow, have resolved to pay an instalment on account of dividend at the rate of 12 per cent. per annum, free of income-tax, for the half year ending March 31 last.



NEW OFFICES FOR THE *ATHENÆUM*.

From the designs and under the superintendence of Mr. William C. Street, F.R.I.B.A., new premises have been erected at Breams-buildings, Chancery-lane, for the accommodation of the Editorial and Publishing Departments of the *Athenæum* and *Notes and Queries*, also the printing establishment of the Athenæum Press, of which Messrs. Francis & Co. are the proprietors. The upper floors or composing-rooms are well lighted by means of the side and back in Church-passage and ordinary square windows, while the extensive machine-rooms in the basement are lit through the medium of a central wall and pavement lights back and front. The front of the building is Venetian-Gothic in character, and the premises are built of red brick, Portland stone, and Aberdeen granite, the contractor being Mr. B. E. Nightingale, of the Albert Embankment.

Finnish Industrial Exhibition.—It has been decided to postpone the holding of the projected Finnish Industrial Exhibition at Helsingfors until next year.

ENGINEERING SOCIETIES.

The Institution of Civil Engineers.—At the ordinary meeting of this Institution, on Tuesday last, Mr. Berkley (President), in the chair, it was announced that five Associate Members had been transferred to the class of Members, and that fourteen candidates had been admitted as Students. The monthly ballot resulted in the election of five Members and of thirty Associate Members. Mr. H. A. Roechling, Associate-Member, read a paper on "The Sewage-Farms of Berlin."

Society of Engineers.—A meeting of the

Society of Engineers was held at the Town Hall, Westminster, on Monday evening, April 4, Mr. Joseph William Wilson, jun., President, in the chair, when the adjourned discussion on Mr. Stephen Sellon's paper on "Electrical Traction and its Financial Aspect" was concluded, and a paper was read by Mr. Reginald Bolton, on "The Application of Electricity to Hoisting Machinery." The author dealt with various methods of distributing power to cranes and hoists, and instances of steam, water, and compressed air, ropes and belts, shafting and gear, and stated the comparative advantages of electricity, among which are handiness, cleanliness, quietude, and economy. Some description was next given of the peculiarities of the electro-motor, which converts the electrical energy into rotative movement, and its distinctive characteristics as applied to the duties of lifting and hauling, and the machine is described as admirably effective, simple, and useful, with the minimum of working parts and an extraordinary efficiency. The author contended that the success of the application depended largely upon mechanical considerations, with several electrical conditions, and instanced several unsuccessful instances where these had been neglected; proceeding next to a description of simple mechanical gear, fulfilling all the requirements laid down, and which are embodied in the design of a ship's winch described and illustrated. A safety device, which also forms part of the apparatus, was described in detail, and it was shown how this prevents the overloading and consequent stoppage of the motor, overcoming in the simplest automatic manner the chief danger to their use. Several successful installations were described, and finally the question of first cost was dealt with, and compared with that of other systems. At the close of the meeting, the usual monthly ballot took place, when the following were duly elected, viz.:—As Life Member, Mr. Ernest Docwra; as Members, Messrs. Douglas Allport, junr., James A. Mingay, Frederick Lennard; as Foreign Members, Messrs. John A. Rossbach, Edward C. Harvey; as Associates, Messrs. Alfred H. C. Olley, William H. Sadler, Arthur S. Harbord, James H. Paul, Maximillian W. H. Clarke, Henry Conradi, Charles N. Spencer, William B. Garstin, Lionel C. H. Savory, Henry T. Jackman, John E. Campbell, Frederick Southey, Joseph B. Kimfull, Takeo Nitta, John H. Hammar, William P. Lipsett, Henry A. Scott, Augustin Mora, Douglas Clark, Gerard L. Baldwin, Harold L. Phillips, Harold T. Creasy, Alexander A. Rawlins, Alexander M. Furlonge, Cyril D. Bury, Reginald L. Bennett, Whitbread D. Silcock.

Books.

Electric-light Cables and the Distribution of Electricity. By STUART A. RUSSELL. London: Whittaker & Co. 1892.

THIS book belongs to "The Specialists' Series," and may, therefore, be regarded as "caviare to the general" reader. For all that, the "general reader" who cares for such things will find it both more interesting and more intelligible than nine-tenths of the scientific works written expressly for him. Just as school histories seem expressly designed to create a loathing for the study of history, so popular science is, generally, at once obscure and dull; sometimes owing to the ignorance of the writer, but more frequently because he is thinking of his audience, while the specialists writing for specialists think only of their subject,—"And being natural, naturally please."

Mr. Russell begins with a short sketch of the first attempts at cable-laying in the early days of telegraphy, pointing out the causes of their failure, and how they were eventually replaced almost universally by the overhead system. In Chapter II. he comes to the subject of "Electric Light Cables," founding his whole treatment of the subject, with an insistance which is rather amusing, on "Thomson's Economic Law."

No doubt, when electrical distribution was in its infancy, and no one knew what thickness of cable to lay, this law was of some use as a rough guide; it could never be more than that; for exact calculation founded on uncertain data, such as cost of labour, allowance for depreciation, and rate of interest on capital, is little better than waste of time; but now that experience and natural selection have settled the matter, the companies that laid wasteful cables have been crowded out, and the survivors have learnt an economic law, as bees learn geometry, without calculation. Mr. Russell states with admirable clearness the various considerations which modify the application in practice of this law; but he apparently fails to perceive that the existence of these qualifications takes the matter out of the hands of the Professor and puts it into those of the practical engineer. As for the tables he quotes from Professor Forbes, we have tried in vain to discover how they were constructed, nor does a reference to the report of the original papers (Cantor Lectures, 1885) help us. One thing, however, is clear, the tables profess to give the current density in terms *inter alia* of "the cost of laying one additional ton of copper." Now we were told at school that an equation was not solved if the unknown quantity appeared in the result; and since the current density in any particular case involves the section of the cable, and the cost of laying a ton of copper must greatly depend on its length, and therefore on its cross section, the tables lose even the academic value they might otherwise possess.

After a chapter on "Rise of Temperature" and "Fall of Potential" in the mains, which, as before remarked, modifies greatly the conclusions of the preceding chapter, we come to an excellent account of the different systems of distribution, followed again by a discussion of their relative economy, in which we find the advantages and disadvantages of the various systems impartially and graphically set forth. We doubt, however, whether there is in actual work any such system of double accumulators as described on p. 89, and we think Mr. Russell hardly does full justice to Mr. Bernstein's ingenious system.

After this are four practical chapters dealing with questions of insulation, making of joints, and the various systems of cable-laying, to which last he returns more fully in the last four chapters of the book.

All these matters are entered into in full detail and with knowledge evidently at first hand. The general consensus of authority, and the carelessness of American linesmen, support Mr. Russell in his general condemnation of bare overhead wires, but if he had had any experience of such a system properly carried out, as in Brighton about 1885, he might see reason to qualify the severity of his judgment, and allow that they are, in many cases, at least as satisfactory as overhead cables with bearer wires, while they are certainly much cheaper.

With respect to this latter system our author gives good reason for objecting to the Board of Trade regulation that the bearer wires should be insulated, pointing out that it is closely analogous to metal sheathing, which it is universally recognised should be connected to earth.

The remaining chapter of the book treats of internal wiring and the testing of cables and circuits, and is as satisfactory and thorough as the rest. To the many disadvantages of woodcasing that the author has collected we may add one more,—it is a favourite resort of cockroaches.

We hope that in a subsequent edition the test given on pp. 184 and 185, and the accompanying figure 50, may be made clearer; at present we cannot see how two relations can be got by one observation; if a key were placed in the short circuit between the resistances the difficulty would vanish. We think Mr. Russell should note, moreover, that this method is identical with the bridge test, instead of so carefully contrasting the two.

The page or so devoted to the calculation of the insulation resistance of a cell might be cut down to a couple of lines if Mr. Russell would make use of the integral calculus.

Forty Plates on Building Construction. By F. MITCHELL. London, Paris, and Melbourne: Cassell & Co.; 1891.

THESE plates, prepared by Mr. Mitchell, the lecturer on building construction at the Polytechnic Institute, should be in the hands of every young student of architecture and building.

Mr. Mitchell has been assisted by other lecturers at the Polytechnic, and, with their help, has produced a series of plates of the very highest value, and certainly superior to any other illustrations of the detailed construction of modern builders' work, that a student can readily find. Specially noteworthy is the care which has been exercised in figuring dimensions and scantlings, and in providing details, for the most part in isometrical projection, showing the various portions of the construction separate from each other, so as to make it easy for a learner to understand the precise articulation of the structure which he is studying.

We should advise all students who work from these plates to draw them out to a very much larger scale, as naturally the drawings here given have been considerably reduced in order to prevent the plates from being unwieldly. The reduction, however, has not seriously affected the clearness of the diagrams, though it has made some of the plates look rather full of work.

We do not suppose that the author intends that these plates should be used entirely without the assistance of a master or of a good text-book, since it would be quite impossible for an unassisted student to comprehend, for example, the meaning of the diagrams given to illustrate the bevels and face moulds for wreathed hand-rails.

One especially good feature of the work is the fact that pains have been taken to bring the diagrams up to date by incorporating illustrations of modern specialised forms of construction.

Ventilation of Buildings.—By ALFRED R. WOLFF, M.E. New York.

IN this small pamphlet by Mr. Wolff we have, within the compass of an ordinary lecture, what the writer accurately describes as "the terse presentation, in a popular way, of the great general principles underlying the proper ventilation of buildings."

We are glad to find ourselves in accord with the principles herein laid down, most of which we have from time to time drawn attention to in our pages, such as, for example, that temperature is no criterion of the efficiency of ventilation.

A useful feature in the pamphlet is the series of tables which the author gives for simplifying the calculations necessary in applying ventilation. Within the compass of such a pamphlet the author could not, of course, fully describe all that he touches upon, but he has well pointed out the chief factors determining the amount of ventilation, the method, and the warming, which necessarily follows the introduction of ventilation, as well as some general hints, which we completely endorse, as to the expense of various methods and forms of apparatus.

Elatée. La Ville le Temple d'Athéna Cranaia; par Pierre Paris. Paris: Ernest Thorin. 1892. (Bibliothèque des Ecoles Françaises d'Athènes et de Rome, publiée sous les auspices du Ministère de l'Instruction Publique. Fascicule Soixantième.)

M. PARIS' book is practically, as he states in the preface, intended to be a monograph on the ancient city of Elateia, but practically by far the greater part of it is devoted to the discussion of the Temple of Athene Cranaia, to which the city owed much of its fame, and the excavation of which is due to the French School of Archæology at Athens. Reports of the progress of this excavation have, of course, appeared from time to time in the Bulletin de Correspondence Hellénique since the beginning of the work in 1884. Now, for the first time, M. Paris presents us with a valuable summary of the results, preceded by an excellent account of the history of the town in ancient and modern times. Elateia was always second in interest among the towns of Phocis to Delphi, with its world-wide renown; but if we may trust Strabo, it was the largest of all. Pausanias (x., 34) devoted a whole chapter to its history and the discussion of its monuments; and he specially notes the Sanctuary of Athene Cranaia, the seat manifestly of an ancient local cult. It is recorded that the priest was always a young boy, and that he used for his bath a peculiar and ancient form of tub called an *ἀσάμινθος*; this *ἀσάμινθος* dates from Homeric days, and M. Paris believes he has found some specimens just big enough to bathe a rather small boy. There is little doubt the tradition must be connected with the famous ceremonial "Bath of Pallas." The book altogether is of great interest in connexion with that early local cult of Athene. The site of the temple itself struck even Pausanias as remarkable; it stood on the crest of a precipitous hill. M. Paris devotes a chapter

to its ground-plan and proposed reconstruction. He believes it to have been of similar construction to the so-called Theseion at Athene, but of somewhat earlier date. There is evidence that baked clay was largely employed in its structure, whereas the Theseion was entirely of marble. Only second in interest to the temple itself are a large collection of votive terra-cottas and inscriptions, which M. Paris discusses in detail.

A Plea for Liberty. An Argument against Socialism and Socialistic Legislation. With an Introduction by Herbert Spencer and Essays by various writers. Edited by THOMAS MACKAY. New and Revised Edition. London: John Murray. 1892.

THIS is a cheap edition of a book which all persons who are interested in the affairs of their time would do well to read. The various writers state their case with clearness and brevity, and in a plain, common-sense style. The faults of Socialism, and the weak points of a system which represses individual freedom, are exposed in a way which any ordinarily educated man should understand. Thus Mr. Herbert Spencer points out what is very apposite at the present time, that every society is apt to take away from the freedom of its members. In trades unions "the regulative agency becomes all powerful. Their members, even when they dissent from the policy pursued, habitually yield to the authorities they have set up." This is perfectly true, and will in time be recognised by working men. Considering that the price of this edition is only 2s., it ought to be very widely read.

Olympia. Die Ergebnisse der von dem deutschen Reich veranstalteten Ausgrabung. Herausgegeben von ERNST CURTIUS und FRIEDRICH ADLER. Textband IV. Die Bronzen und die übrigen kleineren Funde. Tafelband IV. Berlin: Verlag von Asher & Co. 1890.

THIS is the fourth volume in the sequence of the great official work, "Olympia," to whose programme we drew attention about a year ago, but it is the first to appear. It is based mainly on the elaborate studies made by Dr. Fürtwangler on the spot, at Olympia, in 1886, —studies which he revised and enlarged during a shorter stay there in 1888. Dr. Furtwängler had for years been second in command (under Dr. Curtius) over the Antiquarium at Berlin, where all the smaller antiquities, vases, terra-cotta, bronzes, &c., of the Museum, are stored, and there could be no one more competent to undertake the work of elucidating the bronzes of Olympia than he. The task is no light one. In a series of eighty plates he has published and elucidated no less than 1,371 minor objects of antiquity, ranging in date from prehistoric votive offerings to Byzantine jewellery. The antiquities published are as diverse in character as in date. They comprise fragments of statues, statuettes, tektonic fragments, and a vast hoard of votive offerings of every description in bronze and terra-cotta. Of these, the most interesting are undoubtedly those with mythological subjects,—*e.g.*, Herakles and the Old Man of the Sea (inscribed), Ajax and Cassandra, and Hermes, Achilles and Priam, which designs are all impressed on thin bronze plates. The book, as a corpus of a certain class of discoveries, is essential to all archæological libraries, but its appearance will not arouse such interest as many of the subsequent volumes,—*e.g.*, that on the topography, and that on the architecture, of Olympia, in both of which novel discoveries may be looked for.

Wiener Vorlegeblätter für Archäologische. Ubingen, 1890-91. Mit Unter-stuzung des KK. Ministeriums für Cultur und Unterricht. Herausgegeben von Otto Benndorf. Wien: A. Hölder. 1891.

THIS new issue of the invaluable Vienna "Vorlegeblätter" is divided into two parts. The first consists of a corpus of the works of one Greek vase-painter, and that the most prolific of all,—*i.e.*, Nikosthenes; the second contains plates devoted to the statement of certain archæological problems dealing with vase interpretation. The vase-painter Nikosthenes has special claims to attention. He is, perhaps, of all whose signature we possess, the most decorative, and his work in antiquity attained to an extraordinary popularity. We have no really fine examples in the British Museum (his finest work is in the Louvre), so the "Vorlegeblätter" this time specially appeals to English students. The plates are, as usual, first-rate. Not only are many vases published for the first time, but,—a matter scarcely second in importance,—vases hitherto known in inferior plates are now republished from new and accurate drawings. Even the most recent publications are not reproduced without the most exact revision. The "problem" plates will be a genuine delight to all ingenious archæologists, and should be a lively stimulus to students. A well-known but hitherto unexplained vase is reproduced, and, side by side with it, analogous type-forms which may and should help to its solution. Another form of problem is to publish in one sheet a number of fragments known to have been found together, and leave it to the student to reconstruct the design. This is real actual archæological practice, and training alike for mind and eye.

Fünfzehntes Hallisches Winckelmannsprogramm. Scenen des Ilias und Aithispis auf einer Vase der Sammlung des Grafen Michael Tyskiewicz. Fest-schrift zur Eröffnung des Archäologischen Museums der Friedrichs Universität. Halle-Wittenberg: von Carl Robert. Halle: Niemeyer. 1891.

WE have again and again called attention to the necessity of the prompt publication of important works of Greek art in *private* collections, and collections, from the nature of the case, less accessible to science, and always liable to unnoticed dispersion, and we are glad to find the last Winckelmann's Programm devoted to the reproduction of a truly magnificent red-figured krater in the possession of Count Michael Tyskiewicz. The vase is notable for its perfect preservation, it not only being intact, but every line even of the super-imposed brush-work being preserved with extraordinary freshness. The scenes represented are also of great interest. On the one side Diomede contends with Æneas in the presence of Aphrodite and Athene, on the other Achilles and Memnon fight over the fallen body of Melanippos,—Eos and Athene advance on either side to protect their favourite heroes. All the figures are inscribed, so happily the interpretation is undoubted. The text is as valuable as the plates. We cannot here enter into details, but Dr. Robert, with his usual brilliancy, discusses,—apropos of the figure of Melanippos, a new element in the *type*,—the relation of literature and vase-painting with some new and interesting results.

London Street Improvements. By HENRY CLARKE, Chairman of the Improvements Committee of the first London County Council. 1892.

THIS is a pamphlet containing some practical remarks on the special problems of London improvements, with a map and a list of suggested street improvements. Some of the general remarks on the subject are well worth attention. As usual in this country, the improvements are suggested on mere practical and financial grounds, and take no account of opportunities for architectural effect.

La Peinture Antique, par Paul Girard. Bibliothèque de l'enseignement des Beaux-Arts. Publiée sous la direction de M. JULES COMTE. Paris: Quantin.

ON the general excellence of this series, it is now superfluous to insist. Seven of the manuals have found their way into English translations, and we hope this small handbook on ancient painting will shortly appear in the same form. It is unfortunate that whereas the French volume can be got for 3 f. 50 c., they emerge in England (certainly with some substantial additions) at the comparatively high figure of 10s. 6d. We may note one point in which M. Girard's manual on painting is distinctly in advance of the rest, and that is in the matter of illustration. They have been, M. Girard says in his preface, the object of his special attention, and not in vain. So often these elementary and cheap manuals go on reproducing *ad nauseam* wretched cuts of subjects already thrice familiar, that it is a distinct relief to turn over the pages of a book which gives really excellent reproductions of works of art only brought to light within the last three years, or hitherto only accessible in rare or costly publications. We note,—*e.g.*, p. 104,—the remarkable painted bull of Tiryns and the famous Vaphio gold cups which have so lately appeared in the "Ephemeris Archæologike," the lovely painted plaque with the figure of a warrior, recently discovered in the Acropolis; and the fragments,—if possible, still more beautiful,—of the white cylix with Orpheus and the Thracian woman, lately published in the *Hellenic Journal*, but reproduced here from original drawings. The book should be specially welcome to artists, to whom Greek vase-paintings are, as a rule, almost unknown, but by whom, when known, they are highly prized.

SOME RECENT TRADE CATALOGUES.

Messrs. John Bolding & Sons, of South Molton-street, send us a new edition of their illustrated catalogue of plumbers', engineers', and gasfitters' brasswork, valve and earthenware pedestal closets, sanitary earthenware, gullies, air-chambers, and drain-disconnectors. The catalogue is a very comprehensive one, extending to nearly 500 pages. It is well-printed and indexed. Its contents include a good variety of excellent valve and other closets, water waste-preventing cisterns, baths, lavatories (the "Paragon" lavatory basin, with flushing-rim and quick-waste is one of the best things of its kind known to us: one turn of a lever shuts the waste and fills the basin for use; by reversing the lever the basin is emptied and rinsed), and many other things too numerous for mention.

Messrs. Baird, Thompson, & Co, send us their revised and illustrated catalogue of ventilating and heating appliances to meet all requirements. It is clear and concise, and will repay keeping for reference.

Messrs. J. M. Bennett & Sons, of Ardwick, Manchester, send us a useful little catalogue of priced details of stock of logs, dry oak and ash, held by them at the present time. The catalogue gives the length and sale contents, and the number of boards into which each log is sawn, also the date of sawing, sawing contents, and the net cost of log,—timber and sawing included. The catalogue will be found exceedingly convenient by builders, joiners, cabinet-makers, and others in all parts of the country, for in addition to the before-mentioned particulars, there is a table of railway rates for the conveyance of timber from Ardwick station.

From Woodhouse & Rawson United (Ltd.) we have received an illustrated catalogue of hydraulic machine tools manufactured by them on the Payne-Gallwey system. It is an interesting and suggestive production, and contains illustrations and particulars of a great many appliances likely to be of use to the building contractor. The portable hydraulic rivetters will be of great service wherever there is a quantity of ironwork to be built up *in situ*. A hydraulic pile-extractor, figured on page 104, is also worth attention. The catalogue has been compiled by Mr. W. Payne-Gallwey.

Correspondence.

To the Editor of THE BUILDER.

ARCHITECTURAL EDUCATION.

SIR,—A foremost place in the April number of "*A.A. Notes*" is given to a letter from Mr. Thos. G. Jackson, A.R.A., concerning "The Training of Architects to the Pursuit of Architecture," which said letter has a wider interest and more reaching consequences than is comprised in the publication in which it appears.

Mr. Jackson tells us in his letter that he and the memorialists against registration and examination have not been idle, and that one or more meetings have taken place between some half-dozen of those who signed the memorial and some half-dozen members of the A.A., and that, at the request of the latter, Mr. Jackson writes to let "the Association know what has been and is being done," and he very plainly and honestly tells us on what grounds the memorialists will extend their aid to the A.A., and on what conditions; we are also promised a volume of essays, setting forth the view of "various *artists*, exposing the delusive character of a diploma obtained by examination." The italics are my own. The conditions of help from this quarter are the giving up of the present scheme of studies, which "points definitely to preparation for the examination of the Institute," and in return the memorialists will, Mr. Jackson says, "feel it an honour to help . . . . as visitors,

and aid in drawing up, facilitating, and supervising," if we desire it, our scheme of studies; but unless the A.A. purges itself of the old leaven, the memorialists cannot take any interest in our programme. In plain language, renounce the Institute and all its works, and embrace the true faith as set forth by us, the memorialists. Another bait offered is a promised reform of the Architectural Schools at the R.A., and the further possibility that our schools should be affiliated to those of the Academy. Mr. Jackson concludes his invitation to forsake the Institute and join his party thus:—"In conclusion, I can only remind you that the future, so far as concerns any help or co-operation on our part, rests with you. If you turn your faces the right way, you will not find us backward in going with you, if you should think proper to invite our assistance."

Now, sir, I am curious to know who the half-dozen members of the A.A. are who have entered into negotiations with Mr. Jackson and his friends, and whether they have been authorised to do so, and by whom.

That the present scheme of education in the A.A. is more or less the outcome of the Institute examinations is patent; that the promoters of the scheme and the examiners and many of the teachers are members of both bodies is perfectly well known.

That the A.A., by the mouth of its President, in an admirable address, quite recently set forth the new scheme and the claims of the A.A. to the sympathy and aid of the Institute; and that the Institute in reply made a generous grant to the friends of the A.A. stands recorded. That many members of the Institute have, in a very appreciable manner, shown their interest in the work of the A.A., every member who cares to inform himself may know. What the gentlemen, who now seek to destroy the close relationship which exists between the Institute and the A.A., have done for the latter body is not so clear.

If the members of the A. A. are content to be patronised, and to change a very carefully thought out scheme at the invitation of men hostile to the Institute, however distinguished some of them may be, then they have sadly deteriorated from the vigour, determination, and manliness they once possessed, and which has made the A. A. what it is. Everything that the memorialists offer can in time be grafted on to the present scheme, and in the ranks of the Institute are men every bit as able as those few who stand aloof from it to aid with instruction. I trust that before very long the members of the A.A. may have an opportunity of meeting together to discuss Mr. Jackson's invitation, and to reply to it, and at the same time to hear from the half-dozen of their *confrères* to what extent, and by what right, they led Mr. Jackson to suppose that they expressed the voice of the A.A.; and that at the solicitations of the memoralists the A.A. would go back on their old traditions, and,—renouncing their old sturdy independence,—lean upon others for support and guidance.

COLE A. ADAMS,
Past-President Architectural Association.

LINCOLN CATHEDRAL LIBRARY.

SIR,—In my letter on this subject it was not my wish to speak with any disrespect of the late Sir Gilbert Scott. Mr. Ferguson refers to his preservation of old work at Ripon, and I think he might have quoted other places where he was prompted by the same good spirit. Sir Gilbert was, indeed, a man of great activity and intelligence, and by no means anxious to close his mind against new schools of thought, but the sad fact remains that, following in the old grooves, the so-called restorations carried out under his direction involved the most wholesale destruction. His practice having been most extensive, so, too, was the destruction, and this was wrought more particularly in our cathedrals, from which all fittings not of approved "Gothic" were cruelly turned out.

April 3, 1892. SOMERS CLARKE.

REMOVING OLD PAINT.

SIR,—I should be much obliged if any of the readers of your paper could give me any information of any process, other than chipping with a chisel, of removing old paint from stonework. The case to which I refer is that of some stone pillars in a church which years ago have had several coats of paint, which it is now wished to remove. I should be very grateful for any information on this subject.

H. F. WHITE.

The Student's Column.

WARMING BUILDINGS BY HOT WATER.

XV.

BOILERS (*continued*).

IN the previous paper the list given applied to saddle boilers having 2 in. to 3 in. water-ways, according to the size of the boiler. Some people prefer a larger water-way than this, especially if a considerable accumulation of dirt is anticipated, but the boiler-makers, for some reason or other, put a considerably higher working value upon these than on those with the smaller water-ways first referred to. This is deceptive, as the mere fact of adding an inch to the water-way does not increase the direct heating surface at all, it adds a trifle to the outer flue surface, though scarcely sufficient to be worth calculating. Some makers actually attribute one-eighth greater total heating value to the boiler for this little addition in the water-way. It would be unsafe to trust to this.

This larger water-way brings us to consider a question that requires every attention when fixing boilers, viz., provision for, and easy access to clean out, any accumulated matter that may collect or be deposited. In almost every case it is dirt, pure and simple, that has to be removed periodically, and the periods have to be regular and moderately frequent if the apparatus is fed with ditch or pond water, as is frequently the case. Then the supply or filling cisterns are just as commonly without lids, and foreign matter of many kinds, leaves, insects, &c., enter, and all go to increase the collection at the lowest point in the apparatus, the boiler.

The provision for the removal of this is a hole drilled at the bottom of the two sides or legs of the boiler in front, and from these holes, say 1¼ in., are brought two short lengths of pipe through the brickwork that must exist in front. The front ends of these pipes are plugged. By removal of the plugs, a cane or wire can be inserted, and made to disturb whatever soft dirt deposit there may be in the boiler, and this can be flushed out.

Another and entirely different kind of deposit occurs when the apparatus is fed with what is known as "hard" water, and this water frequently renewed,—that is, water withdrawn and replaced with fresh. This deposit, which is actually carbonate of lime, adheres to the boiler plates tenaciously, and is very hard, and requires very generally to be chiselled off.

This state of things is not common in heating works as, in the first place, the water must be "hard," such as we get from water companies' mains in the South of England, and not surface or rain water. Then, in addition to this, the water must be rather frequently changed, as, although we get a certain quantity of lime deposit from one charge of water, the quantity is so very small as to be harmless and imperceptible. If an apparatus is used for both heating and yielding a supply of hot water in a building, then the trouble will certainly occur if the water be "hard." Kitchen-range boilers that are used exclusively for yielding hot water suffer greatly in this way in London and the South of England.

Boilers are made of cast iron, wrought iron, and copper. The latter material is but seldom used. Cast iron is used to some extent, particularly in small boilers, and its adaptability to larger ones is successfully illustrated in Keith's boilers, which can only be spoken well of. The great fault with articles of cast iron lies with the founder who does not, for reasons known to himself, use a good admixture of metals. It is quite possible to have cast iron of a quality that possesses features quite contrary to what are generally expected. It will not crack if subjected to really violent usage and blows; if struck with moderate care at an edge, the material will burr over instead of particles flying off, and by skilful hammering flat plates can be actually bent a little, and all this without annealling or specially treating, except in the selection of the different brands of pigs. A metal like this is really tough, and shows a most irregular and rough fracture when broken.

Wrought-iron, however, is the material chiefly used at present for boilers of moderate and large size, both of the brick-set and independent kind, the joints being welded. Welded joints are cheaper than rivetted, and are very satisfactory. Of course, very large boilers, like the Cornish pattern, &c., have rivetted joints, as they are too large to be conveniently welded. The general thickness of plate is ⅜ in. This is a serviceable strength, and can be recommended, but there is no objection to $\frac{5}{16}$-in. plate if the boilers are small. The difference in cost between $\frac{5}{8}$ in. and ⅜ in. is about 20 per cent. The thicker plate should be used wherever cost will allow, although the writer is in doubt whether it would give 20 per cent. more service than that which is only $\frac{1}{16}$ in. thinner. It is possible that when thinner plates are used they are of a less quality than the others; perhaps some boiler-maker will contradict this if incorrect. It has to be remembered that the majority of boilers fail by an accumulation of dirt causing their fracture, and not from ordinary wear and tear.

There now remains one other feature to be treated before proceeding with the actual description of boilers, and this is the area of furnace bars needed to effectually work certain sizes and certain patterns. This subject is of importance, though, of course, those who use boilers but little, have no need to calculate the size of furnace-bars required; the boiler maker will supply them with the other fittings of a correct size, with the boiler, if ordered.

This is a question that Hood also treats fully and successfully in his book. His allowance in this respect is 50 square inches area of furnace bars to each 100 ft. of 4-in. pipe, or 100 superficial feet of radiating surface. This allowance only applied to the saddle boiler. The newer forms of boilers having internal flues, &c., do not require so great an area in proportion to the pipe they can effectually heat as is shown in the table given further on. It will be noticed that the area of furnace bars is fixed by the quantity of pipe to be heated, and this, at first sight to the inexperienced, may appear to be a peculiar arrangement. Such, however, is not the case, and a little thought will show that no better plan could be devised. If we tried to decide the area of bars by the width or length of boiler, we should probably get irregular results, and if we calculated by the actual direct and indirect heating surfaces, then we should get exactly the results as calculating by the quantity of pipe, but at unnecessary trouble.

Table showing the area of furnace-bars required for each 100 ft. of radiating surface, with the various kinds of boilers at present in use:—

	Square inches.
With a plain saddle boiler	50
With a saddle boiler having one check or waterway end	45
With a saddle boiler having two waterway ends	40
With a saddle boiler having a tubular flue as fig. 56	40
With boilers as figs. 57 and 58, which have both waterway ends and tubular flues	35
If a boiler is fitted with an oval cross-tube, the above figures can be reduced by	5 to 10

The above will be seen only to apply to boilers which are brick-set. Independent boilers are always fitted up with bars and the other fittings by the maker. Many independent boilers are worked with a less proportionate area of bars than the above. Keith's Challenge boiler, for instance, only has about 20 square inches of bars per 100 ft. of radiating surface. It is understood that, when speaking of area of fire bars, the spaces between the bars are included.

From the table it will be seen that a plain saddle-boiler, estimated to heat 800 ft. of radiating surface, should have an area of bars of 400 in. (say 24 by 17); but if this same-sized boiler was fitted with an oval cross-tube, its estimated power would be increased to 1,000 ft., but it would not require any greater area of fire-bars.

If the pipes to be used are not 4 in., then allowance must be made as follows:—For 3-in. pipe a fourth less, for 2-in. pipes one-half less area of fire-bars than 4 in. For instance, if we can work 100 ft. of 4-in. pipe with 50 square inches of bars, then the same area will be suited for 133 ft. of 3-in. pipe, or 200 ft. of 2-in. pipe. It was mentioned in the last paper that in calculating the working value of boilers, similar allowance has to be made.

THE FERDINAND'S BRIDGE, VIENNA.—As everyone knows, it was the custom in the Middle Ages to build houses on both sides of bridges, such as was the case with old London Bridge, the Rialto, and the Ponte Vecchio in Florence, and now it is projected to follow this ancient custom in rebuilding the Ferdinand's Bridge across the Danube. It is proposed to line the bridge on both sides with shops, the rents of which would go far towards covering the cost of construction.

OBITUARY.

MR. T. H. EAGLES.—At the meeting of the Royal Institute of British Architects on Monday evening last, as reported in another column, the death was announced of Mr. Thomas Henry Eagles, M.A., F.R.I.B.A., and Professor of Architecture at Cooper's Hill College, Staines. He was elected an Associate of the Institute in 1871 and a Fellow in 1881.

MR. JOHN RHIND, A.R.S.A.—On the 5th inst., Mr. John Rhind, sculptor, who was recently elected an Associate of the Royal Scottish Academy, died in Edinburgh. He was born in Banff, where his father was a builder, and to that trade he served his apprenticeship. He went to Edinburgh to study architecture; but, having a taste for sculpture, he entered the studio of the late Mr. Handyside, A.R.S.A. In 1858 he commenced practice for himself, and subsequently carried out many works in connexion with Scottish buildings.

MR. W. J. BEADEL, M.P.—We regret to hear that Mr. W. J. Beadel, M.P. for the Chelmsford Division of Essex, died on the 5th inst., after several weeks' illness, at his residence, Hutton Hall, Brentwood. He was born in 1828. Since 1846 Mr. Beadel had been an estate agent and surveyor, and he had served as President of the Surveyors' Institution.

DR. JOHN COLLINGWOOD BRUCE, F.S.A.—We regret to learn that Dr. J. C. Bruce, the well-known antiquary, died at Newcastle-on-Tyne on Tuesday last. He was a prolific writer on antiquarian subjects, but will be best remembered by his "Historical and Descriptive Account of the Roman Wall in the North of England." He was in his eighty-seventh year. The *Newcastle Chronicle* of Wednesday last contains a long and interesting memoir of Dr. Bruce and his labours as a minister of religion, philanthropist, and antiquary.

GENERAL BUILDING NEWS.

ADDITIONS TO CATHOLIC CATHEDRAL, PORTSMOUTH.—On the 31st. ult., the consecration took place of the new additions to the Cathedral church of St. John the Evangelist, in Edinburgh-road, Portsmouth. The building is from the designs of Mr. Joseph S. Hansom, and is in the Gothic style of the Decorated period, cruciform in shape. When completed it will have a tower and spire at the west end, but for the present this portion of the scheme remains in abeyance. The building of the transepts, sanctuary, &c., has been carried out by Messrs. W. R. & C. Light, of Landport, under the superintendence of Mr. J. W. Randle as clerk of the works, and Mr. John Townsend as foreman. The new work consists of the transepts, each 24 ft. wide by 20 ft. deep; the sanctuary, terminating in an apse, 52 ft. long from the eastern arch of the nave, by 26 ft. wide; the Lady Chapel, on the south side of the sanctuary, 30 ft. long by 12 ft. wide; and St. Edmund's Chapel, on the north side, 22 ft. long by 12 ft. wide; while there have also been added a porch and entrance lobby on the south side of the Lady Chapel, and on the Alfred-road side of the Cathedral four confessionals, sacristies, tribune, guardian's room, and other apartments that cover a considerable area, extending across to the school wall, which they join. A covered way leads from these to the Bishop's house. The external walls are of Fareham red bricks, relieved by Portland stone dressings, and the roof is covered with red tiles. In the sanctuary there are thirteen two-light windows, with pointed and tracery heads. In the north transept a five-light window, 32 ft. in height and 18 ft. across, the pointed arch filled with tracery, is constructed, and in the gable of the south transept is a rose-window of floriated design, 18 ft. 6 in. in diameter. Below this a recessed arcading of stonework is formed, which will accommodate a peal of ten of Harrington's tubular bells. The sanctuary walls are flanked by a series of buttresses, each of which is surmounted by a Portland stone pinnacle, with carved crockets and finials and sunk tracery panels. A coping of stone, pierced with a quatrefoil design, also runs round this wall. The apex of the apse is crowned by an ornamental wrought-iron cross. At the outer angles of the transepts are four buttresses, supplied with stone weatherings, and surmounted by carved crocket finials, and the gables are coped with moulded stone, terminating on either side in a carved stone cross. Above the principal windows in the gables are two small quatrefoil lights. At the entrance to the porch is an ornamental wrought-iron gateway, manufactured by Messrs. Jones & Willis, of London. The stone carving, both externally and internally, has been executed by Mr. George Porter, of Chelsea. In the interior the sanctuary is divided from the nave by a rood-screen of wrought-iron, constructed by Messrs. Powell, Hardman, & Co., Birmingham. Around the apse the walls (which, like the other parts of the interior, are faced with Beer stone) are relieved by dark marble columns extending to the ribs of the roof. The ceilings both in the sanctuary and transepts are of wood, groined, perforated, and stained and varnished; in the chapels they are of deal, stained and varnished, with ribbed mouldings. The floors are of wood-block, Duffy's patent. The altar is raised some 3 ft. above the floor of the nave. In the Lady Chapel a carved stone reredos, which formerly occupied the wall at the end of the south aisle, has been placed above the altar. The doors are of panelled oak, and the windows are filled with cathedral-tinted glass with ruby borders.

ADDITIONS TO GENERAL POST OFFICE, EDINBURGH.—Extensive additions are being made to the General Post Office, Edinburgh, on vacant ground immediately to the east of that building. When the present Post Office was comtemplated, the Office of Works objected to the plans prepared by their local architect, the late Mr. Robert Mathieson, as being beyond the requirements of the department, and it was only owing to pressure being put forth by the local authorities that the design was carried out in its entirety. Two departments,—the Board of Lunacy and the Ordnance Survey,—were accommodated for a time in the new edifice, but these departments had after a short time to make way for the increasing requirements of the Post Office. It is lucky that there is ground left for the addition now urgently required.

MISSION HALL, CARDIFF.—The memorial stones of a new mission hall were laid at the East Moors, Cardiff, on the 23rd ult. The hall is situated in Carlisle-street, and is designed to accommodate 1,000 worshippers. The large hall is 72 ft. by 48 ft., and a gallery runs round the entire building, supported upon light iron columns, which help to support the roof. In front of the hall is a large class or committee room. The fresh air inlets will be fixed about 7 ft. above the floor level, and exhaust ventilators in the ceiling for the extraction of vitiated air. The cost of the building when completed will be 2,000*l*. Schools are intended to be erected in the rear of the present building, land being reserved for this purpose. The building is being erected by Messrs. Thomas & James, of Cardiff, from the design and under the superintendence of Messrs. Habershon & Fawckner, architects, Cardiff.

THE NEW NATIONAL SCOTTISH OBSERVATORY.—The plans of the new National Scottish Observatory have now been completed, says the *Scotsman*, and the erection of the buildings on Blackford Hill, Edinburgh, will, it is expected, be proceeded with immediately. The plans have been prepared by Mr. W. W. Robertson, of her Majesty's Board of Works. The buildings consist of an observatory proper and transit house, placed along the north front of the site, with detached residences on the south slope. There is also a gatehouse at the entrance, which is to the south side. The Observatory proper will consist of a T-shaped building, with a frontage towards the north of 180 ft. It shows towards the city an unbroken range of flat-roofed central buildings having a mean height of 30 ft., and consisting of a principal story and a basement. These are flanked by octagonal towers of unequal size, crowned with large cylinders of copper,—the larger tower 75 ft. high and 40 ft. in diameter, placed at the east end; and the smaller, 44 ft. high and 27 ft. in diameter, placed at the west end. The design is Italian in style, with an admixture of Greek feeling, says the same journal. The stone employed is freestone, and the basement is built of rusticated ashlar work. The principal story of the central building is pierced with eleven windows. They have carved jambs and lintels, and on the wall spaces between them are carved the signs of the Zodiac. Along the length of the building, over the windows, runs a moulding, and the whole is surmounted by an ornamental balustrade. In the larger tower there are two rows of windows. The lower story windows have pilastered jambs and carved pediments, and the decoration of the upper story windows is after the same style, and has been combined with that of a projecting parapet. In the smaller tower there is one row of windows, which have been similarly treated, and the pediment of the window facing the town has carved upon it a representation of Phaeton driving the chariot of the Sun. The Observatory will be used for physical as well as for astronomical observations. In the towers are to be placed the two large equatorial telescopes. The telescopes are to rest on massive, hollow, brick piers, completely isolated from the surrounding walls and floors. The larger pier is 50 ft. high and 23 ft. square at the base, and both taper towards the seat for the telescopes. A small vault is to be formed in the interior of the larger tower for housing the standard sidereal clocks. The upper stage of each tower will consist of the cylinder of copper in which the equatorial telescopes are placed, and each has an observing aperture extending from the horizon to the zenith. Each will rotate upon a vertical axis so as to admit of its being turned with the telescope. The apartments below the domes will be used as chart rooms, and in the base of the larger tower will be placed a suite of rooms for photographic purposes. The central range of buildings between the towers is to be occupied by laboratory rooms for the astrophysical side of the Observatory work. In the angle between the large tower and the central buildings, at the back, has been placed a turret carrying a spiral stair, and beside it is a smaller turret carrying a lift for convenience in moving apparatus. The flat roof of the central buildings has been adopted to facilitate communication between the towers. In the principal story, beginning at the west end, there will be a room used for spectroscopic work; and to the south of the building, outside this room, will be placed a heliostat, by which the rays of the sun will be reflected into the apartment through a 10-in. aperture in the wall. Next will come the experimenting room, or working laboratory, having three isolated pillars for delicate measuring operations, and there also the mean time clocks will be kept. Then comes an electric room, which will be the centre of the electric system for lighting and scientific purposes. Next will come the mechanics' workshop and cleaning room; and, lastly, the chronograph room. The basement of the range is to be occupied by stores, workshops, and printing room. Southward from behind the central building extends a wing 80 ft. in length and 28 ft. wide. It consists of three floors, and has the entrance to the Observatory on the west side. The basement floor is to be occupied by the heating apparatus, and rooms for the dynamos and accumulators in connexion with the electrical apparatus. The principal floor will contain the library, with accommodation for about 30,000 volumes. Besides the library, this floor will contain the directors' room, ante-room, and computing-room. The top floor is to be occupied by a long apartment to be used in connexion with the 15-in. heliostat. It is for spectroscopic and photographic purposes when long distances are required, and insulated rails are fitted up in it so that the delicate instruments in use are free from vibration. The room will be lighted from the roof by skylights, the shutters of which can be closed instantaneously. At a distance of 80 ft. west from the main Observatory, and in line with the north-west front of it, is to be placed the transit house, which is connected with the main building by a covered way. The walls and roof are to be of corrugated iron, covered with curved louvres of tinned steel, with an air space between of about 6 in., the object being to prevent radiation and secure uniformity of temperature between the inside and the outside of the building. The Observatory being above the level at which the water of the Edinburgh and District Water Trust can be supplied by gravitation, a large tank will be provided on the principal floor of the great tower for the storage of water, which will be forced up by a pumping apparatus placed in an underground chamber near the Harrison Arch, and worked by an electric motor with a current supplied from the Observatory. The dwellings will be lighted with gas, but electric light will be provided for the Observatory buildings. The whole Observatory will be heated with hot water from a central furnace. The cost of the building, including fittings, will be about 34,000*l*., and the contract has been entrusted to Messrs. W. & J. Kirkwood, Edinburgh.

ENLARGEMENT OF CHAPEL, BROMPTON HOSPITAL.—The Chapel of the Brompton Hospital for Consumption is undergoing considerable enlargement from designs by Mr. Wm. White, F.S.A., and there has just been re-laid, in the centre of the east wall of the extended chancel, the foundation stone which originally occupied a similar position. The bottle found, containing an inscription in good preservation on parchment, was replaced beneath the removed stone. The ceremony was of the simplest character, only members of the Board, besides the architect, being present. After a few prayers offered by the chaplain, the stone was laid by Mr. T. Percival Beckwith, the chairman of the Board. The chancel will be extended in length and in breadth to about double its former area; a new aisle is added on the north side, and the organ aisle is rebuilt to a similar extent. The dressed stonework of the old chapel is much decayed, but as much as possible of the old work is retained or re-used, incorporated into the new work. The stained glass, given by various benefactors, had got into a bad state, much of the painting having peeled off, and the leadwork being decayed. This is being carefully repaired and made good for replacement in the removed windows.

SANITARY AND ENGINEERING NEWS.

PEASMARSH SEWERAGE.—The Rural Sanitary Authority of the Rye Union (Sussex), at their meeting on the 29th ult., appointed Mr. H. Bertram Nichols, C.E., of Birmingham, to prepare a scheme and report on the sewerage and sewage disposal of the parish of Peasmarsh.

ROYTON (LANCASHIRE) SEWERAGE.—A Local Government Board Inquiry was held at Royton, Lancashire, on the 31st ult. by Colonel Luard, R.E., with regard to the application of the Local Board for permission to borrow the second instalment of money for works already sanctioned by the Local Government Board, and also for sanction of a further loan for the erection of sludge-pressing plant, a refuse destructor, and sundry other works, to complete the sewage works now in course of construction. The original sewerage scheme was approved by the Local Government Board two or three years ago, and a loan of 27,500*l*. sanctioned. This sum was chiefly for the sewers of the

district, and the subject of the recent inquiry was chiefly to enable the purification works to be completed in the most efficient manner suggested by recent experience. The engineer for the scheme, Mr. Theo. S. McCallum, C.E., of Manchester, explained the general arrangement of the sewers and the details of the works. Nearly one half of the district is now sewered and the work is progressing. The purification process decided upon is the "international," and the settling tanks, filters, &c., are nearly completed. The precipitant will be added to the sewage automatically by one of Keirby's patent mixers. The sludge will be pressed and subsequently calcined in destructor furnaces. The refuse destructor will adjoin the sewage tanks, and the waste heat from the burning of ashpit refuse will be utilised to raise steam for the sludge-pressing. The destructor and sludge-pressing plant is being supplied by Messrs. Goddard, Massey, & Warner, of Nottingham. Jones' fume cremator is to be used. The cost of the sewerage scheme for Royton, the sewage purification works (including fifteen acres of land), and the destructors will be about 51,500*l.* In connexion with the sewage works, several special features have been introduced. The contractor for the tanks, filters, &c., is Mr. S. Johnson, of Pendleton.

FOREIGN AND COLONIAL.

FRANCE.—In the large gallery of the National Conservatoire of Arts and Crafts in Paris, a marble bust of Nicolas Appert has been erected. He was the inventor of the process of preserving foods. The bust is the work of the sculptor Roulleau.——The annual exhibition of Pastellistes, and the Black and White exhibition, have just been opened, the former in the Galerie Georges Petit, the latter for the first time is held in the Palais des Arts Libéraux in the Champ de Mars.——It is announced that the Society of the Rose Cross is going to be dissolved owing to the violent discussions between the principal organisers.——The Museum of wood carvings, copies of old works, which was begun in 1888, in the Trocadero, by M. Ravaisson, is going to be re-organised provisionally in the old riding-school of the Louvre. This Museum is replaced by a new collection of similar sculpture in the Trocadero.——On account of the re-organisation of the Service of Historical Monuments MM. Sauvageot and Darcy have sent in their resignations. They have been replaced by M. Vaudremer, member of the Institute, and M. André Michel, art critic.——On Sunday last a hospital was opened in the neighbourhood of Vincennes and Montreuil. It will serve for the suburbs of Paris in that quarter.——During the course of some works carried on under the direction of M. Mazoy, in the Canal of Briarè, the remains of a Roman town have been brought to light. The town, called Gannes, lies between Châtillon sur Loire and Beaulieu. Amongst the things found are some well-preserved pavement, several tools, ornaments, and coins. Owing to the necessity of continuing the work, all traces of the town will have disappeared by the end of the year.——The Society of Amis des Arts have placed in one of the halls of the Evreux Museum a bronze bust of Philippe Rousseau, modelled by M. Gérôme.——The Cardinal-Archbishop Langémeux is about to present to the Cathedral of Reims a great statue of St. Paul. It is in the style of the sculpture of the Roman decadence. The draperies are in bronze, the head, hands, and feet in white marble.——The bust of the poet Pierre Gringoire is to be erected by public subscription. The bust has been executed by M. E. Bussière.——The competition for the Hôtel de Caisse and Salle des Conferences at Meaux has been decided. The first premium has been awarded to M. Perdrigé, the second to M. Simôn, and the third to M. Bondinand.——The Mairie situated in the Rue Drouot, one of the richest centres of Paris, is going to be the object of an important artistic decoration. Independent of the Salle des Mariages which will be decorated with paintings, there is to be placed in the court-yard (an interesting specimen of eighteenth-century work) a group of busts of the principal celebrities of the quarter,—Lamartine, Mirabeau, Pigalle, and Berlioz, and four statues symbolising the nature of their respective talents.

BERLIN.—During the last week of the Session the Imperial Reichstag devoted some time to the Inland Navigation question. A Bill had been brought in relating to the construction of the Dortmund-Ems Canal, which is to run in connexion with the proposed great "trans-Prussian" canal.——In the course of a debate on the General Purposes Budget, Herr von Meyer (Arnswalde) proposed that the Government should place in their Budget for 1893-94 an item "to be spent in studentships, &c., for young and talented artists engaged in the study of monumental painting and sculpture." The proposal was coolly received by the Government and strongly opposed by Clerical and German Liberal parties. It hence fell through.——Owing to the bad financial results obtained by the Administration of State Railways, the number of so-called "quick" trains running on the main lines is to be reduced.——The Railway Administration intends introducing the mean European time for the time-tables and actual working of all its railroads throughout the country.——Again the foundation-stone for a new church has been laid with royal pomp. The Emperor has given the site for this church, and 200,000 marks of the 380,000 required for its erection. There will be 1,300 seats in the building. Herr F. Schulze is the architect.——The Berlin Chamber of Commerce will meet on the 6th inst. to discuss the preliminary steps that are to be taken in the arrangement of the proposed Berlin International Show for 1896.——The question of altering Berlin's chief thoroughfare, the "Unter den Linden," has again come to the front. The authorities have elected a special committee to decide on a practical plan, according to which the traffic on this thoroughfare can be more conveniently regulated.

MISCELLANEOUS.

GLASGOW INSTITUTE OF ARCHITECTS: THE BUILDING REGULATIONS BILL.—At a quarterly meeting of the Glasgow Institute of Architects, held on the 31st,—Mr. William Leiper, A.R.S.A., in the chair,—a report by the Council of the Institute with regard to the Building Regulations Bill was submitted to the meeting. The Council reported that they had drawn up a petition to Parliament against the Bill, embodying the principal points in the report formerly printed and circulated, that the petition had been lodged in the private Bill Office of the House of Commons, but that an intimation had subsequently been received from the promoters of the Bill that it was their intention to object to the *locus standi* of the Institute. The Council, however, did not consider it incumbent upon them to contest the matter, considering that they had sufficiently performed their duties towards the public in making the views of the Institute known. Attention was called to the inconsistency shown by the promoters of the Bill in respect that at first they had objected to the amendments urged by the Institute, on the ground that the Institute was an interested party, but that when the Institute wished to have an opportunity of bringing its views under the notice of the Committee of the House of Commons before which the Bill is to come, the promoters then objected to the Institute being heard on the ground that it had no interest in the Bill.—The congratulations of the Institute were offered to the President and Mr. Honeyman on their election to the Associateship of the Royal Scottish Academy, which in honouring them did honour to itself and the profession. Mr. W. F. Salmon, vice-president, and Mr. J. J. Burnett were appointed Governors of the Glasgow School of Art for three years, in terms of the new articles of association. After some other business the meeting separated.—*Glasgow Herald.*

THE INCORPORATED ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.—The thirteenth Examination, held under the auspices of this Association, was held at the Institution of Civil Engineers, Westminster, on Friday and Saturday, the 1st and 2nd of April, when eighteen gentlemen presented themselves for examination, the written portion of which was taken on the first day. The greater part of the second day was occupied with the *viva voce* division of the Examination. The Examiners were: I., For Engineering as applied to Municipal Work, Mr. Clement Dunscombe, M.A., M.Inst.C.E., Westminster; II., Building Construction, Mr. James Lemon, M.Inst.C.E., Southampton (Past President); III., Sanitary Science, Mr. Charles Jones, M.Inst.C.E., Ealing, W. (Past President); and, IV., Public Health Law, Mr. Joseph Lobley, M.Inst.C.E., Hanley (Past President). The next Examination will be held in October.

INTERNATIONAL ELECTRICAL EXHIBITION IN MOSCOW.—It is officially announced that La Section Moscovite de la Société Impériale Technique Russe intends holding an international electrical exhibition in Moscow between April 14 and October 14 this year. There will be eight sections, viz.:—1, electric lighting; 2, telegraphy and telephony; 3, electro-technology, the use of electricity on railways, in war, medicine, &c.; 4 and 5, electric motive power; 6, scientific apparatus; 7, new discoveries in all branches of technical science; 8, literature, plans, designs, &c., connected with electricity. The cost of space is 90 francs per square mètre in the main building whether wall or floor, and for detached exhibits 180 francs per square mètre. The charges include the cost of cleaning, watching, catalogues, &c., as well as the installation of mounted exhibits.

SANITARY CONVENIENCES IN MARYLEBONE.—On Thursday, the 7th inst., the public convenience which the Vestry have constructed at Oxford-circus was opened for inspection. It is noticeable that accommodation has been provided for women as well as for men. The convenience, which is placed under the centre of the roadway north of the Circus, is so arranged as to cause the least possible hindrance to traffic,—the exterior being a rest of 6 ft. in width, and about 60 ft. in length. The entrance steps at each end are surrounded by an ornamental cast-iron railing. The walls of the interior are faced with white glazed bricks, the floor being of coloured encaustic tiles. In addition to urinals and closets, lavatory accommodation is also provided. The convenience is well lighted during the day by means of pavement lights, and at night by the electric light. For the purpose of ventilation Kite's system has been adopted. The whole of the work has been carried out by Messrs. Finch, from plans prepared by Mr. Tomkins, Surveyor to the Vestry. The total cost is about 2,400*l.*

"THE LOCAL GOVERNMENT JOURNAL."—After an existence of twenty years, the weekly journal hitherto known as *The Metropolitan* has changed its title, and will in future be known as *The Local Government Journal.* This change is brought about by the fact that the scope of the paper has outgrown the limited, though large, area of London, and has spread over the whole kingdom, dealing with the news connected with local government of every department all over the country. It is an exceedingly useful journal, and under its new name it will no doubt be increasingly successful and useful.

SQUARE-HOLE BORING-TOOLS.—We have received the prospectus of a company formed to work the square-hole drill patented in 1890 by Messrs. James Melling and J. R. Hughes. The invention consists of a drill, triangular in section, but working through a square template, and drilling a hole the size of the template. The promoters claim that this drill requires no costly machinery, depending on the shape and action of the drill, which can be fixed in any lathe or machine.

REMOVALS.—Mr. Evelyn Hellicar, architect, has removed his offices from Wellington-street to 10, Serjeants'-inn, Fleet-street.——Messrs. Wheatley, Kirk, Price, & Goulty announce that they have removed from 52 to 49, Queen Victoria-street, E.C.

NEW MAPS OF LONDON.—We have received from Mr. Stanford a map of London showing metropolitan railways, tramways, and miscellaneous improvements according to plans deposited at the Private Bill Office up to November of last year. As many of these will probably be carried out sooner or later, this constitutes a map in advance of future improvements. Mr. Stanford also sends us a "County Council Map of London," showing the boundary of jurisdiction of the Council, and boundaries of urban sanitary districts and Boards of Works.

SURVEYORSHIP APPOINTMENT.—At a meeting of the Hanwell Local Board, held on Tuesday last, Mr. Sidney Barnes, Assistant to the Surveyor to the Ealing Local Board, was appointed Surveyor to the Board. Mr. E. J. Reynolds, late of the same office, has just entered on his duties as Surveyor to the Friern Barnet Local Board.

EATON HALL.—The Duke of Westminster has commissioned Messrs. Shand, Mason, & Co., of London, to construct an improved pattern steam fire-engine for the protection of Eaton Hall, near Chester, and the numerous farms upon the property. A trained fire-brigade is maintained on the estate.

LEGAL.

LIABILITY OF LANDLORD FOR SANITARY DEFECTS:

CASE UNDER THE PUBLIC HEALTH ACT (LONDON).

IN the City of London Court, on Monday, before Mr. Commissioner Kerr and a jury, the case of Gebhardt *v.* Saunders was heard. The action was brought by Mr. Thomas Gebhardt, 9, Tankerville-road, Streatham Common, to recover the sum of £18. 5s. 7d. from the defendants Messrs. Saunders, Hawksford, & Bennet, of 68, Coleman-street, E.C., for which it was contended they were liable (as the plaintiff's landlords) under the Public Health Act of last year.

Mr. Johnston Watson, counsel for tha plaintiff, stated that the case was one of some importance, as it was the first which had been tried under the Public Health Act, which came into force on January 1 last. The plaintiff became the tenant of the defendants of the house, 9, Tankerville-road, Streatham Common, at a yearly rental of £47. After he had been in occupation of the house for a little time he noticed bad smells arising from the cellar, and these continued for several months, until the cause was discovered in January last. A quantity of soil had accumulated in the cellar, where it was found that the drain-pipe had become broken, and the sewage went on escaping until there were 3 in. of water and soil covering the whole area of the cellar. The plaintiff communicated with the defendants, his landlords, and also with the Sanitary Inspector of the Wandsworth District Board of Works. The inspector served a notice on the premises, addressed to the "owner or occupier," giving orders for repairs to be done to the drains. These the plaintiff did by calling in his builder, and then it was discovered that the drain-pipe was a 4-in. instead of a 6-in. pipe, and that the pipes were simply laid on the ground instead of on a bed of concrete. This caused the pipes to become irregular, and was the reason which accounted for their breaking. Additional repairs had to be done, and now it was sought to make the defendants liable under the Public Health Act.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premium.	Designs to be delivered.
*Improving Open Space called "The Maes"	Criccieth Loc. Bd.	6l. 6s.	May 27
*Town Hall and Public Offices	Llanelly Loc. Bd.	50 and 20 guineas	June 18

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
*Sewerage Works	Hambledon R.S.A.....	W. N. Lailey	April 12
Alterations at Workhouse.....	Plymouth Union	H. J. Snell	do.
Granite, &c. Road Metal	Sharnbrook (Bedford) Highway Board	*Official*	do.
*10-ton Steam Road Roller, &c.....	Mile End Old Town Vestry	J. W. Knight	April 13
Police Station, Keith, N.B.....	.....	F. D. Robertson	do.
Steel-plate Girder Bridge over River Suir, Ireland	Gt. Southern & Western Railway	K. Bayley	do.
Caretaker's House, New Fenshaw School, Fence Houses	Penshaw and Offerton (U.D.) School Bd....	*Official*	do.
*Blue Guernsey Granite Spalls.....	West Ham Union	do.	do.
*Kerbing and Channelling	Hackney Bd. of Wks..	do.	do.
*Gullies, Grates, Manhole Covers, &c.	do.	do.	do.
*Asphalte Works	do	do.	do.
*Sewerage Works	Petersfield R.S.A.	W. N. Lailey	do.
*New Arches, Urinal, &c.	Borough of Brighton..	F. J. C. May.....	April 14
Workhouse Hospital Extension	Cardiff Union	Seward & Thomas	do.
Roadway (8 miles in length), Waterhead, Cumberland	Mr. Marshall	.....	do.
*Broken Granite.....	Norwich Corporation	P. P. Mitchell	April 16
*Sixty Sluice Valves and Eighty Hydrants	Staudish-with-Langtree Local Board....	Heaton & Ralph	do.
*Laying Water Mains	do.	do.	do.
Seven Through Houses, Midgley, Halifax	.....	T. L. Patchett.....	do.
Flint, &c. Road Metal.....	Hollingbourn High. B.	J. S. Roper	April 18
*Fire Brigade Station, Dulwich	London County Council	*Official*	do.
*Wood Paving Works	Wandsworth Bd. of W.	do.	April 19
Shop and Business Premises, Old Market, Halifax	.....	Horsfall & Williams ..	do.
Three Bridges, Kirkmichael, Banff	.....	R. Davidson.....	do.
*Additions, &c. to Town Hall.....	Shoreditch Vestry...	C. Barry.....	do.
Rag and Block Stone	Gravesend Commrs. of Sewers	*Official*	April 20
Technical School, Batley, Yorks	.....	H. B. Buckley.....	do.
Chapel and School, Thurgoland, Barnsley	.....	Geo. Moxon	do.
Additions, &c. to Schools, Swalwell	Whickham Sch. Bd. ..	T. C. Nicholson	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor or Engineer.	Tenders to be delivered.
Mansion House, Glen of Rothes, N.B.	.....	C. C. Doig.....	April 20
Semi-detached House, Sowerby Bridge, Yorks	.....	Utley & Gray	April 21
Thirteen Houses, Sowerby Bridge, Yorks	.....	do.	do.
*Police Station, Courts, Offices, &c.....	Blackpool Corp.	J. Wolstenholme	do.
Workshops, Gas Tank, &c.	Warrington T. C.	W. S. Haddock	do.
*Drainage of Christchurch Workhouse....	St. Saviour's Union, Surrey	Jarvis & Son.....	do.
Wesleyan Chapel, Crossgates, Leeds.....	.....	Geo. F. Danby.....	April 22
Widening a Bridge, Waver, near Wigton	Cumberland C. C.	G. J. Bell	April 23
*Sewerage Works.....	Canterbury Corp.	*Official*	do.
*New Roads, Sewers, &c. Surbiton	.....	S. Mather	do.
*Asphalte Paving	Portsmouth U. S. A..	*Official*	April 25
*Aberdeen Pitchings.....	Bermondsey Vestry ..	do.	do.
Rag Stone and Pit Flints	Sheppey R. S. A.	do.	April 26
*Labourers' Dwellings	Manchester Corp.	J. Allison	do.
School and Class-rooms, near Halifax	Stainland-with-Old-Lindley Sch. Bd.....	C. F. L. Horsfall & Son	April 27
Sewerage Works.....	Pocklington U.R.S.A.	G. Bohn.....	do.
*Completion of New Workhouse	St. Pancras Guardians	A. & C. Harston.....	do.
*Widening Viaduct, Cardiff	G. W. R.	*Official*	do.
*Sewerage Works.....	Worthing Corp.	do.	May 3
*Supply of Materials	War Department	do.	No date
*Gravel, Granite, Siftings, &c.	Royal Hosp, Chelsea..	do.	do.
*Making Road on an Estate	.....	A. Strong	do.
*Rebuilding Portion of Church Tower, Northamptonshire.....	.....	Talbot-Brown & Fisher	do.
*Shops, Houses, Citadel, &c. Belfast	Salvation Army	W. G. Scott	do.
*Shops, Houses, Citadel, &c. Liverpool	do.	do.	do.
Twenty-three Cottages, Commercial-road, Hanley, Staffs	Overfield & Goesstrey	John Taylor	do.
Biscuit Factory and Warehouse, Cardiff..	Spillers & Bakers, Ltd.	Veall & Sant.....	do.
Improvement Works, Westgate-road, Newcastle-on-Tyne	....	Philip Spicer	do.
House and Alterations to Buildings, Keay Garth, near Gilsland.....	.....	T. Taylor Scott	do.
Steam Laundry, Botcherby Bridge	Carlisle Steam Laundry & Carpet Beating Co...	do.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Inspector of Nuisances, Surveyor, &c.....	Southborough Loc. Bd.	220l.....	April 19
*Builder's Clerk	Westminster Vestry..	100l.....	April 20
*Borough Engineer.....	Salford Corp.	500l.....	April 23

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., & viii. *Public Appointments, p.* xxi.

Section 121 showed that "any costs and expenses which are recoverable under this Act by a sanitary authority from an owner of premises may be recovered from the occupier for the time being of such premises; and the owner shall allow the occupier to deduct any money which he pays under this enactment out of the rent from time to time becoming due in respect of the premises, as if the same had been actually paid to the owner as part of the rent." The plaintiff had paid the rent to avoid a distress, and he, therefore, now claimed for the repairs.

Mr. Rufus Isaacs, counsel for the defendants, did not dispute that there was a structural defect in the house, but he raised the technical objection that the defendants had been served with no notice to do the repairs, and that as the plaintiff chose to do them on his own responsibility, he must pay for them. The owners were only liable for structural defect when notice had been given. The Sanitary Inspector's notice said nothing about there being any defective structures. It only spoke about repairs to drains and stoppage.

Mr. Watson explained that the reason for that was that when the Sanitary Inspector called at the house he only saw the cellar flooded with sewage. When the ground was opened, and the drains laid bare, he saw there was no concrete underneath them, and then he gave orders for the work to be completed properly.

Mr. Isaacs said, if that were so, when the additional work was found to be necessary the Sanitary Inspector should have given notice to the owner. As that was not done, the plaintiff could not recover.

Mr. Watson pointed out that Section 128 provided that notice should be served by leaving it on the premises.

Mr. Isaacs: That is not on the owner.

Mr. Watson urged that it was sufficient.

Mr. Commissioner Kerr, after further argument, said he was inclined to take Mr. Isaac's view of the technical objection that the defendants ought to have had notice. The plaintiff would have to go to the High Court, as the question was one of so much importance. He knew that houses were built very badly in the present day, but legislation was only passed to make landlords do repairs when they had had notice. An Act of Parliament did not necessarily make landlords erect sanitary houses. He non-suited the plaintiff, and allowed the defendants costs.

The jury were therefore discharged without being called upon to give a verdict.

CAPITAL AND LABOUR.

THE LONDON BRICKLAYERS. — The Operative Bricklayers' Society have submitted for the approval of their members a proposed code of working rules for London. It is suggested that the code of rules should come into force on June 1 next. The workmen, we understand, have approved of the proposed code of rules by a large majority, and the code has been submitted to the master builders, who have not yet expressed their views on the subject. Failing compliance with the men's demands, a strike is talked of. The following is the code proposed by the workmen:—

"RULE 1.—The working time for bricklayers in summer shall be nine hours per day for the first five days of the week, and five hours on Saturday. Work to commence at 6.30 a.m., and cease at 5 p.m., except on Saturday, when work shall cease at 12 noon. There shall be allowed half an hour for breakfast each day, and on the first five days of the week one hour for dinner.

RULE 2.—From the second Monday in November and the twelve following weeks the working time shall be 8½ hours per day for each of the first five days of the week, and 4½ hours on Saturday. Work to commence at 7 a.m. each day, and cease at 4.30 p.m., except on Saturday, when work shall cease at 12 noon. There shall be allowed half an hour for breakfast each day, and on the first five days of the week half an hour for dinner.

RULE 3.—That the minimum rate of wages be 10d. per hour; this clause to apply to all bricklayers wherever employed, and at whatever class of work employed at.

RULE 4.—That no time beyond the above hours be worked except when necessary, and then to be paid at the rate of time and a-half from the ordinary time of ceasing work until 8 p.m., and double time from 8 p.m. until the ordinary time of commencing work next morning. On Saturdays double time to commence from 12 noon, and continue for all time worked until the ordinary time of starting on Monday morning. Bank Holidays and Christmas Day to be paid for the same as Sundays.

RULE 5.—One hour's notice to terminate the engagement on either side, and all wages due to be paid at the expiration of such notice.

RULE 6.—That all bricklayers sent to country jobs be paid London rate of wages, with 1s. per day in addition as country money. Employers to pay lodgings, rail, and 'bus fares to and from, and if the workman is discharged through no fault of his own, his time travelling home to be paid for.

RULE 7.—That payment of wages commence at 12 noon on Saturdays, and to be paid on the job, but if otherwise arranged, walking time at the rate of three miles per hour to be allowed to get to the pay table at 12 noon.

RULE 8.—That no part of a workman's wage be deducted for charitable, benefit club or insurance purposes, under any circumstances. That the employer shall provide a suitable place on all jobs in which workmen can have their meals.

RULE 9.—The wages earned on Saturday only be kept in hand as back time.

RULE 10.—The London District shall comprise the area contained within a radius of twelve miles from Charing Cross, and in which these rules shall be in force."

MEETINGS.

SATURDAY, APRIL 9.

Edinburgh Architectural Association.—Visit to Yester House and Old Castle, and Nunraw.

MONDAY, APRIL 11.

Society of Arts (Cantor Lectures).—Mr. Bennett H. Brough on "Mine Surveying." III. 8 p.m.

Clerks of Works' Association (Carpenters' Hall).—Annual Meeting. 8 p.m.

TUESDAY, APRIL 12.

Institution of Civil Engineers.—Discussion on Mr. H. A. Roechling's paper on "The Sewage-Farms of Berlin." 8 p.m.

Society of Arts (Applied Art Section).—Mr. C. Purdon Clarke on "English Brocades and Figured Silks." 8 p.m.

Sheffield Society of Architects and Surveyors.—Annual Meeting at the School of Art. Mr. W. H. Bidlake on "Timber, its Growth and Characteristics."

WEDNESDAY, APRIL 13.

Civil and Mechanical Engineers' Society.—Mr. G. M. Lemmi on "The Development of Ordnance." 7 p.m.

THURSDAY, APRIL 14.

Institution of Civil Engineers.—Students' visit to the works of Messrs. Siemens Bros. & Co., at Charlton. 2 p.m.

Dundee Institute of Architecture.—Mr. W. D. M'Kay on "The Art of the Low Countries." 8 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

1,435.—FLUSHING APPARATUS: *W. H. Bodin.*—This specification relates to automatic flushing apparatus for water-closets, urinals, folding, and other lavatories and the like, and drains. As applied to water-closets, urinals, or lavatories, the apparatus consists of a flushing-pipe and a closed tank at the top thereof, which are normally empty, and a valve or valves arranged to be operated by the movement of the water-closet-seat or by a footboard, so that upon the seat or footboard being depressed one of the said valves is opened and water under pressure flows from the water supply up the flushing-pipes into the tank and compresses the air therein; and upon the seat or footboard being allowed to rise the water supply to the tank is closed and a valve in the flush-pipe opened, allowing the contents of the flush-pipe and tank to be expelled by the compressed air and by gravity, and the basin flushed out. The arrangement and combination of the valves and pistons as applied to different forms of urinals, lavatories, and for drains are fully set out and illustrated in the specification and drawings.

7,138.—ARCHITECTURAL FACINGS: *E. Wehrli.*—This patent relates to the manufacture and use of cast or moulded covering plates, slabs, or the like, of cement or concrete. These slabs can be employed for covering the whole structure of the façade or other part of a building, and are arranged as facings and supported between binding pieces, such as border and cornice pieces, which may be also cast or moulded. These comparatively thin slabs, as well as the binding pieces, are, to enable them to be securely held, and to be readily arranged in position, formed at their sides or edges with joints or connexions. The slabs may be provided with insertion pieces for ornamental purposes, or for binding or strengthening them. Any desired colour may be imparted to these slabs, and thus a great variety in the construction of façades and the like may be obtained.

7,145.—FLUSHING BASINS: *W. T. Allen.*—This specification relates to an improved form of automatic basin for flushing water-closets, drains, &c., consisting of a basin of any material fixed or hung on a pivot and placed in a frame or pipe, which receives water from surface drainage or otherwise, and is so weighted that, when it becomes filled with water to a certain level, it revolves automatically and discharges the contents into the drain or otherwise for the purpose of flushing the same.

7,209.—WINDOW-FASTENERS: *W. Eddleston.*—This invention relates to improvements in fasteners for securing and bolting windows when the latter are either closed or open, and preventing the same from being moved from the outside. It consists of a rack or recessed bracket on the window-sash, and a bolt on the window-frame, by which the distance the window is open can be adjusted and then secured.

215.—FIRE-GRATES: *A. J. Boult.*—The object of this invention is to better utilise fuel in heating apparatus by the employment of a hollow fire-grate having no direct connexion with the steam boiler, when employed to heat such, but adapted to have water circulated through it to prevent the "burning on" of slag, for which purpose its hollow bars, forged or wrought of homogeneous metal or material, are wedge-shape in section, and connected with the transverse carriers or bridges either frictionally or by means of screw threads, the hollow terminal trunnions being of a different shape in section, and narrower than the bar proper. The advantages claimed for such a grate are fully set out by the inventor.

NEW APPLICATIONS FOR LETTERS PATENT.

March 21.—5,493, E. Carter, Automatic Water-closet Disinfector.—5,547, A. Boult, Hinges.

March 22.—5,598, J. Anderson, Joiner's Jobbing Bench.—5,624, A. Boult, Ventilating Devices for Windows.—5,644, A. Lamplough, Sash-fasteners.—5,647, J. Dungey, Fittings for Gas and other similar Pipes and Tubes.

March 23.—5,674, A. Thornalley, Fire-grates and Stoves for Consuming its own Smoke.—5,682, J. White, Automatic Grip Sash-holder.—5,683, J. Harries, Artificial Stone.—5,710, D. Faulkner, Fireproof and Sanitary Partitions or Divisions.—5,732, J. J. A. Lee, Electric Light Fittings.—5,746, A. Morse, Destemper for Walls, Ceilings, &c.

March 24.—5,752, J. Hickling, Tombstones or Monuments.—5,801, S. Cook and J. Chambers, Sash-fasteners.

March 25.—5'830, F. Tunks, Bakers' Ovens.—5,863, D. Morison, Taps.—5,887, J. Ingram and others, Adjustable Sliding Sashes.

March 26.—5,932, J. Kirkman, Water-closets.—5,946, W. Price, Screws for Joiner's and other use.—5,949, W. Allen, Means of Rendering Air and Water-tight Sliding Sashes, either old or new, in dwelling houses, or elsewhere.—5,950, W. Kinniple, Caissons or Bridges to close and open, or bridge across, and leave clear as required the entrances to graving docks, wet docks, harbours, rivers, or estuaries, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

3,215, C. Pyrce, Kilns.—3,446, K. Friedrick, Woodworking Tools.—3,644, R. Tootall. Ventilating Fans.—3,671, M. Piper, Fastenings for Doors, &c.—3,771, H. Cottrell and G. Pauling, Device for Preventing the Smoke Nuisance.—3,905, J. Roots, Suspending, Raising, or Lowering Gasaliers, &c.—3 908, S. Jacobs, Fire-grate. 3,991, G. Nunn, Electrical Call and Indicating Apparatus.—4,052, P. Mancheron, Fire-grates. —4,061, G. Williamson, Kitchen-ranges.—4,280, R. Hocking, Water-closets.—4,281, W. Shears, Tool employed in working Wood, such as planes, spoke-shaves, &c. —4,286, E. Fulcher, Machine for Moulding, Paving, Slabs, Building, Ornamental and other Blocks and Bricks.—4,295, J. Ardin and J. Brown, Construction of Blocks or Bricks for Street Pavements.—4,379, J. Shanks, Fittings for Baths, &c.—4,445, G. Pawson, Securing Knobs to Brass Mountings of Door and other Furniture. —4 511, S. Turner, Fireproof Floor.—4,518, R. Carey, Hydraulic Lifts.—4,572, W. Macnamera, Stops for Gates.—4,590, A. Thrower, Girders.—4,656, R. Harrison, Devices for Opening, Closing, and Adjusting Windows, Fanlights, &c —4,790, T. Robinson, Cross-cut Saw-benches.—4,791, T. Bradbear, Closet-fittings.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

3,531, G. Hayes, Metallic Lathing.—3,539, H. Brunson and E. Gillett, Building or Paving Blocks.—3,586, C. Armstrong, Kilns or Ovens for Burning and Glazing Sanitary Ware, &c.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MARCH 28.—By *George Head & Co.*: 9, 11, and 13, Bride-st., Caledonian-rd., u.t. 58 yrs., g.r. 31*l.* 10s., 285*l.* —By *Wells & Read*: 70 and 72, Kyverdale-rd., Stoke Newington, u.t. 88 yrs., g.r. 13*l.* 10s., r. 75*l.*, 790*l.*—By *Belton & Sons*: 8, Bodney-rd., Hackney, u.t. 80 yrs., g.r. 7*l.*, 375*l.*—By *Hampton & Sons*: The residence, "St. Agnes," near Basingstoke, and 1½ acres, f., 1,000*l.*; twelve f. cottages, 1,225*l.*

MARCH 29.—By *J. C. Platt*: 1 and 3, Adelaide-rd., Shepherd's-bush, f., r. 110*l.*, 1,800*l.*; 64, Carter-st., Walworth, g.r. 3*l.* 12s. 6d., r. 30*l.*, and a l g.r. of 9*l.* 12s. 6d., u.t. 53 yrs., 475*l.*—By *W. Spearman*: 78, Sistova-rd., Balham, u.t. 85 yrs, g.r. 7*l.* 10s, 380*l.*—By *A. Richards*: 3 to 10, Hatch-row, Lambeth, f., r. 156*l.* 16s., 1,630*l.*; 103 to 109 (odd), Glengall-rd., Old Kent-rd., u.t. 82 yrs., g.r. 28*l.*, 300*l.*—By *Debenham, Tewson, & Co.*: 66 to 70, Leather-lane, Holborn, f., area 6,955 ft., 6,950*l.*; 28, Brushfield-st., Bishopsgate, f., r. 52*l.* 10s., 900*l.*; a profit rental of 74*l.* a year, Buckingham-rd., Kingsland, u.t. 32 yrs., 1,110*l.*; f.g.r. of 60*l.*, with reversion in 89 yrs., Great Turnstile, Holborn, 1,640*l.*; "The Three Magpies" public-house, and 7a. 1r. 12p., f., Harmondsworth, 2,460*l.*; c.g.r. of 33*l.* 11s. 6d. secured on "The Royal William," public-house, Dorset-rd., Clapham; and 14 and 16, Kibworth-st., with reversion to rack rents in 8 yrs., 1,700*l.*; "The Phœnix Brewery," 106, Dorset-rd.; and 9, Kibworth st., at a Peppercorn rent, with reversion in 8 yrs., 890*l.*; 108 to 116 (even), Dorset-rd., with reversion in 8 yrs. 800*l.*; "The Black Horse," public-house, 10, Bedfordbury, Charing-cross, f., r. 52*l.* 10s., 1,720*l.*; 37, Queen-sq., Bloomsbury, f., r. 165*l.*, 2,710*l.*; stabling, f., 18, Ormond-yd., 1,020*l.*; f.g.r. of 10*l.*, secured on "The Duke of Wellington," public-house, Ball's Pond-rd., Kingsland, f.; and 176, 178, and 180, Culford-rd., with reversion in 12 yrs., 4,110*l.*—By *Rogers, Chapman, & Thomas*: i.g.r. of 75*l.* 12s., Cumberland-st., Pimlico, u.t. 45 yrs., g.r. 8s., reversion for 9½ yrs., 1,738*l.*; i.g.r. of 75*l.*, Sutherland-st., u.t 46 yrs, g.r. 9s., reversion for 8 yrs., 1,710*l.*; i.g.r. of 29*l.*, Sutherland-ter., u.t. 46 yrs., g.r. 3s., reversion for 10 yrs, 636*l.*; i.g.r. of 10*l.*, Lupus-st., u.t, 45 yrs., at Peppercorn, reversion for 3 yrs., 208*l.*—By *W. & F. Houghton*: three houses and shops, Orford-rd., Walthamstow, f., r. 60*l.* 6s., 650*l.*; 1 to 4, Church End Cottages, f., r. 78*l.*, 790*l.*; 2 to 5, Church End, Walthamstow, f., r. 80*l.*, 1,070*l.*; a block of freehold stabling premises, r. 25*l.*, 600*l.*; 1 to 4, Church-ter., f., r. 132*l.* 8s., 1,150*l.*

MARCH 30.—By *Briant & Son*: No. 253, Clapham-rd., f., 1,820*l.* — By *J. Millburn*: 215, Goldhawk-rd., Shepherd's-bush, u.t 51 yrs., g.r. 5*l.* 8s., 600*l.*—By *E. Grice*: 5, Johnson-st., Commercial-rd., f., 350*l.*—By *R. A. Enright*: 138 and 140, Richmond-rd., Dalston, and a plot of land, u.t. 46 yrs., g.r. 12*l.* 10s., 790*l.*; 27, Sparholt-rd., Crouch-hill, u.t. 54 yrs., g.r. 5*l.* 10s., 275*l.*; 1 to 5, Caroline-cottages, Newington-green, no term given, g.r. 15*l.*, 200*l.*—By *R. Tidey & Son*: 24, Bride-st., Barnsbury, and 5 and 7, Dorinda-st., u.t. 30 yrs., g.r. 7*l.* 4s., 100*l.*; an improved g.r. of 13*l.*, Brixton, u.t. 9 yrs., g r. 5*l.* 10s., 40*l.*—By *F. Jolly & Co.*: 14, Dynham-rd., Hampstead, u.t. 90 yrs., g.r. 9*l.* 10s., 265*l.*; 37, Approach-rd., Victoria-pk., u.t. 62 yrs., g.r. 5*l.*, r. 40*l.*, 470*l.*—By *Trollope & Sons*: 7 to 33 odd, Everard-st., Commercial-rd., f., 1,960*l.*; f.g.r. of 69*l.* 6s., Providence-st., &c., Commercial-rd., with reversion in 27 yrs., 1,800*l.*; f.g.r. of 2*l.*, Grove-st., with reversion in 10½ yrs., 150*l.*; f.g.r. of 22*l.* 2s., with ditto in 10½ yrs., 2,000*l.*; f.g.r. of 13*l.* 15s., with ditto in 10 yrs., 805*l.*—By *D. Smith, Son, & Oakley*: 191, High Holborn, f., r. 110*l.*, 1,430*l.*; 27 and 29, Great Queen-st., Long-acre, f., r. 145*l.*, 3,040*l.*; f.g.r. of 60*l.*, Ham-yd., St. James's, with reversion in 32 yrs., 1,460*l.*; 9 and 10, Smith's-ct., and 6 to 9, Ham-yd., f., 1,300*l.*; 21, Scrutton-st., Finsbury, f., r. 40*l.*, 540*l.*; 14 and 16, Edna-st, Battersea, u.t. 85 yrs., g.r. 13*l.*, 490*l.*; f.g.r. of 3*l.*, Sand-st., Woolwich, reversion in 43 yrs., f.g.r. of 27*l.*, reversion in 20 yrs., 625*l.*; enclosures of freehold land, 51a. 3r. 27p., Farnborough, a cottage and garden, f., 20*l.*, 320*l.*

MARCH 31.—By *D. Young*: 2 to 36 (even), Regent-rd., Herne-hill, u.t. 73 yrs., g.r. 5½*l.*, 2,880*l.*; 24, Melbourne-grove, Dulwich, u.t. 82 yrs., g.r. 6*l.*, r. 30*l.*, 290*l.*—By *Newbon & Co.*: 39, Sumatra-rd., Hampstead, u.t. 90 yrs., g.r. 6*l.*, rent 30*l.*, 235*l.*; 1, Klea-av., Clapham Common, u.t. 93 yrs., g.r. 6*l.* 10s., r. 33*l.*, 300*l.*—By *H. Griffin*: 1 to 23 (odd), Benham-street, Battersea, u.t. 74 yrs., g.r. 44*l.* 15s., 1,280*l.*—By *Collier & Henderson*: 23, Heyworth-rd, Clapton, f., r. 45*l.*, 655*l.*; f.g.r. of 28*l.*, Mentmore-ter., Hackney, with reversion in 82 yrs.; f.g.r. of 13*l.*, with ditto in 81 yrs., 1,025*l.*; f.g.r. of 7*l.* with ditto in 81 yrs., 170*l.*; f.g.r. of 21*l.*, with ditto in 82 yrs., 525*l.*—By *Battam & Co.*: 4 to 9, Wells-pl., Ealing, f., 660*l.*; 9, 10, and 11, Oak-st., f., 330*l.*; 1 to 8, Charles-st., f., 975*l.*; 17 to 22, Charles-st., f., 820*l.*; Well's-pl., and Charles-st., f.g.r. of 8*l.* with reversion in 30 yrs., 250*l.*; "The Prince of Wales," public-house, Charles-st., f., r. 36*l.*, 730*l.*; 17 to 20, Western-rd., u.t. 70 yrs., g.r. 9*l.*, r. 88*l.* 10s., 780*l.*; 33, 35, and 37, Lancaster-rd., u.t. 30 yrs., g.r. 3*l.* 16s., 300*l.*—By *P. D. Tuckett & Co.* (at Forest Gate): 30, 36, 44, and 46, Clarence-road, Upton-pk., u.t., 92 yrs., g.r. 15*l.* 12s., r. 92*l.*, 870*l.*; Forty-eight plots of freehold land, Gipsy-lane, &c., 3,053*l.*

[*Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	9/0/0 — 0/0/0
Teak, E.I...	load	10/10/0 — 15/0/0
Sequoia, U.S.ft.cu.		2/3 — 3/0
Ash, Canada	load	2/10/0 — 4/0/0
Birch, do.		3/5/0 — 4/10/0
Elm, do.		3/10/0 — 4/15/0
Fir, Dantsic, &c.		2/0/0 — 3/10/0
Oak, do.		3/0/0 — 5/5/0
Canada		5/10/0 — 7/0/0
Pine, Canada red		2/10/0 — 3/10/0
Do, yellow		2/10/0 — 5/0/0
Lath, D'ntsic, fath		5/0/0 — 6/0/0
St. Petersburg		5 0/0 — 7/0/0
Deals, Finland, 2nd & 1st std	100	8/10/0 — 10/10/0
Do, 4th & 3rd..		7/10/0 — 8/10/0
Do. Riga		6/10/0 — 8/0/0
St. Petersburg, 1st yellow ..		11/0/0 — 15/0/0
Do. 2nd yellow		8/10/0 — 10/0/0
Do. white		7/10/0 — 10/10/0
Swedish		7/15/0 — 16/0/0
White Sea		8/10/0 — 18/0/0
Canada, Pine 1st		20/0/0 — 26/0/0
Do. do. 2nd....		14/10/0 — 16/0/0
Do. do. 3rd, &c.		8/0/0 — 10/5/0
Do. Spruce. 1st		9/10/0 — 11/0/0
Do. do 3rd & 2nd		6/15/0 — 8/0/0
New Brunswick		7/0/0 — 7/10/0
Battens, all kinds		3/10/0 — 15/10/0
Flooring Boards, sq., 1 in. prep. 1st		0/8/8 — 0/14/6
Do. 2nd		0/7/6 — 0/11/8
Other qualities		0/4/6 — 0/8/0
Cedar, Cuba ..ft.		/3½ — /4½
Honduras, &c.		/2½ — /4
Mahogany, Cuba.		/4½ — /6½
St. Domingo, cargo av		/4½ — 2/0
Mexican do. do		/4 — /5
Tobasco do. do		/5½ — /7
Honduras do..		/5½ — /6½
Box, Turkey	ton	4/0/0 — 15/0/0
Rose, Rio		10/0/0 — 20/0/0
Bahia		9/0/0 — 15/0/0
Satin, St. Domingo .	ft.	0/0 8 — 0/1/3

TIMBER (*continued*).		
Satin, Porto Rico		0/0/8 — 0/1/6
Walnut, Italian..		0/0/3½ — 0/0/7
METALS.		
IRON—Pig, in Scotland	ton	2/0/10 — 2/1/0
Bar, Welsh, in London		6/0/0 — 6/10/0
Do. do. at works in Wales		5/10/0 — 6/0/0
Do. Staffordshire, in London		6/5/0 — 6/15/0
COPPER—British, cake and ingot		49/0/0 — 49/10/0
Best selected ..		50/0/0 — 51/0/0
Sheets, strong..		59/0/0 — 60/0/0
Chili, bars		45/12 6 — 46/0/0
YELLOW METAL	lb.	0/0/5½ — 0/0/5¾
LEAD—Pig, Spanish	ton	10/15/0 — 10/17/6
English, com. brands		11 2 6 — 11/5/0
Sheet, English, 3 lbs. per sq. ft. and upwards ..		13/0/0 — 0/0/0
Pipe		13/10/0 — 0/0/0
ZINC—English sheet	ton	25/5 0 — 0/0/0
Vieille Montagne		25/15 0 — 8/0/0
TIN—Straits		89/15/0 — 89/17/6
Australian		90/0/0 — 90 2/6
English Ingots		93/0/0 — 93/10/0
OILS.		
Linseed	ton	18/10 0 — 18/12/6
Cocoanut, Cochin		24/10/0 — 0/0/0
Do. Ceylon		22/10/0 — 0 0 0
Palm, Lagos		23/0/0 — 0/0/0
Rapeseed, English pale		25/10/0 — 0/0/0
Do. brown		23/10/0 — 0/0/0
Cottonseed ref...		19/0/0 — 0/0/0
Oleine		21/10/0 — 22/10/0
Lubricating, U.S.		4/0/0 — 5/0/0
Do. refined		5/0 0 — 10/0/0
TAR—Stockholm	barrel	0/19/0 — 1/0/0
Archangel		0/12/6 — 0/0/0

TENDERS.

*** **Next week communications for insertion under this heading must reach us** *not later than 12 noon on Wednesday,* **as we go to press a day earlier than usual.**

BIRMINGHAM. — For erecting villa residence, Hagley-road, Edgbaston, for Mr. Urban Broughton. Mr. Joseph Lavender, architect, Wolverhampton:—

Moffat & Sons	£1,178	Sapcote & Sons	£979
B. Guest	1,050	G. Cave, Wolverhampton*	978

* Accepted.

BOSTON (Lincolnshire).—Accepted for the erection of a villa residence, on the West-street-road, Boston. Mr. James Rowell, architect, Boston:—

Building.

C. Jessop, Boston £480 0 0

Plumbing, Painting, Glazing, Gas-fitting, and Bell-hanging.

B. F. Parker, Boston 64 0 0

KENT.—Accepted for the repairs of main-roads in Kent, 1892-93, for the Kent County Council:—

Sec. 1, Dartford, 10 m. 0 f. 12p.	
Kent Road Co., Gravesend	£2,723 7 9
Sec. 2, Dartford, 14m. 7f. 0p.	
Kent Road Co., Gravesend	2,532 7 6
Sec. 3, Bromley, 9m. 1f. 20p.	
Kent Road Co., Gravesend	2,594 11
Sec 4, Bromley, 10m. 3f. 0p.	
Peill & Sons, Bromley	1,131 17 6
Sec. 5, Wrotham, 10m. 0f. 0p.	
E. B. Chittenden, West Malling	1,220 7 1
Sec. 6, Rechester, 10m. 6f. 24p.	
Tuff & Miskin, Rochester	3,025 3 8
Sec 7. Rochester, 5m. 0f. 20p.	
Kent Road Co., Gravesend	555 2 6
Sec. 8, Hoo, 1m, 3f. 0p.	
Tuff & Miskin, Rochester	1,657 9 2
Sec 9, Milton, 7m. 4f. 25p.	
Tuff & Miskin, Rochester	894 15 10
Sec. 10, Milton, 9m. 5f. 0p.	
Tuff & Miskin, Rochester	915 19 2
Sec. 11, Sheppy, 6m. 2f. 34p.	
Tuff & Miskin, Rochester	993 0 0
Sec. 12, Sevenoaks, 12m. 3f. 0p.	
E. B. Chittenden, West Malling	1,339 2 6
Sec. 13, Sevenoaks, 13m. 1f. 0p.	
E. B. Chittenden, West Malling	1,498 11 8
Sec. 14, Tonbridge, 6m. 1f. 0p.	
F. Playfoot, Edenbridge	910 14 0
Sec. 15, Tonbridge, 12m, 4f. 16p.	
Kent Road Co., Gravesend	3,774 11 3
Sec. 16, Tonbridge, 12m. 6f. 12p.	
W. & G. Arnold, Frant	2,068 12 6
Sec. 17, Tonbridge, 15m. 2f. 30p.	
Arnold & Lambert, Frant	3,704 9 9
Sec. 18, Malling, 4m. 5f. 20p.	
E. B. Chittenden, West Malling	409 5 4
Sec. 19, Malliny, 13m. 6f. 34p.	
E. B. Chittenden, West Malling	2,271 15 0
Sec. 20, Malling, 14m. 4f. 19p.	
E. B. Chittenden, West Malling	2,395 14 1
Sec. 21, Maidstone, 6m. 3f. 20p.	
Maidstone Rural Sanitary Authority	1,144 13 3
Sec 22, Maidstone, 10m. 2f. 22p.	
Maidstone Rural Sanitary Authority	933 5 0
Sec. 23, Maidstone, 6m. 5f. 20p.	
J. Ellis & Co., Maidstone	1,449 0 0
Sec. 24, Maidstone, 10m. 0f. 30p.	
Kent Road Co., Gravesend	2,078 18 4
Sec. 25, Cranbrook, 3m. 5f. 20p.	
W. Lambert, Horsmonden	2,311 10 0
Sec. 26, Cranbrook, 10m. 4f. 0p.	
Kent Road Co., Gravesend	1,860 3 4
Sec. 27, Cranbrook, 11m. 6f. 20p.	
Kent Road Co., Gravesend	1,533 0 0
Sec. 28, Hollingbourne, 9m. 3f. 0p.	
R. L. Knight, Sittingbourne	1,140 13 4
Sec. 29, Hollingbourne, 12m. 4f. 0p.	
J. Ellis & Co., Maidstone	1,096 17 6
Sec. 30, Hollingbourne, 15m. 2f. 20p.	
Kent Road Co., Gravesend	2,213
Sec. 31, Hollingbourne, 6m. 4f. 0p.	
N. Marley, Detling	752 10 0
Sec. 32, Faversham, 9m. 2f. 0p.	
Faversham Highway Board	1,070 9 7
Sec. 33, Faversham, 11m. 6f. 0p.	
Faversham Highway Board	1,040 2 6
Sec. 34, West Ashford, 13m. 7f. 4p.	
E. B. Chittenden, West Malling	1,448 1 8
Sec. 35, West Ashford, 12m. 6f. 9p.	
E. B. Chittenden, West Malling	1,593 1 8
Sec. 36, East Ashford, 9m. 2f. 0p.	
R. L. Knight, Sittingbourne	1,575 0 4
Sec. 37, East Ashford, 8m. 6f. 0p.	
R. L. Knight, Sittingbourne	802 5 0
Sec. 38, East Ashford, 13m. 2f. 0p.	
R. L. Knight, Sittingbourne	956 0 0
Sec. 39, Tenterden, 9m. 6f. 27p.	
Tenterden Highway Board	1,618 7 4
Sec. 40, Tenterden, 9m. 3f. 27p.	
Tenterden Highway Board	1,789 14 6
Sec. 41, Tenterden, 7m. 6f. 32p.	
Tenterden Highway Board	1,193 0 4
Sec. 42, Romney Marsh, 7m. 2f. 2p.	
Kent Road Co., Gravesend	643 5 0
Sec. 43, Blean, 6m. 0f. 15p.	
T. Ashenden, Canterbury	716 13 3
Sec. 44, Blean, 10m. 5f. 14p.	
T. Ashenden, Canterbury	944 12 0
Sec. 45, Thanet, 14m. 0f. 13p.	
Kent Road Co., Gravesend	1,174 0 0
Sec. 46, Thanet, 7m. 6f. 37p.	
Kent-road Co., Gravesend	976 1 3
Sec. 47, Bridge, 10m. 5f. 0p.	
Bridge Rural Sanitary Authority	1,416 6 10
Sec. 48, Bridge, 15m, 1f. 36p.	
Bridge Rural Sanitary Authority	1,582 4 2
Sec. 49, Elham, 13m. 0f. 20p.	
Elham Rural Sanitary Authority	1,427 0 0
Sec. 50, Elham, 9m. 3f. 20p.	
Elham Rural Sanitary Authority	1,075 17 6
Sec. 51, Elham, 10m. 4f. 7p.	
Elham Rural Sanitary Authority	1,462 10 3
Sec. 52, Eastry, 8m. 5f. 0p.	
Eastry Rural Sanitary Authority	1,633 7 0
Sec. 53, Eastry, 11m. 7f. 0p.	
Kent Road Co., Gravesend	1,894 18 4
Sec. 54. Dover, 9m. 1f. 0p.	
Dover Rural Sanitary Authority	1,014 10 8
Sec. 55, Dover, 9m. 2f. 20p.	
Dover Rural Sanitary Authority	1,060 12 6
Sec. 56, Romney Marsh Level, 3m. 2f.	
The Lords of Romney Marsh Level	426 5 0

	M.	F.	P.
Total Mileage	566	7	21

	£.	s.	d.
Total amount of accepted tenders	83,694	16	5
County Surveyor's estimate	83,709	2	10

LEICESTER.—For additions to shoe factory, for Mr. C. G. Allen. Messrs. Roberts & Gordon, architects, Leicester:—

Clark & Garrett	£705 0	T. C. Tyers	£640 0
T. & H. Herbert	673 10	W. H. Kellett*	631 15
W. J. Iliffe	673 1		
H. Plant	652 0		

* Accepted.
[All of Leicester.]

LONDON.—For the enlargement of the Pakeman-street School, Lower Holloway, by 360 places, for the School Board for London, Mr. T. J. Bailey, Architect :—

G. S. S. Williams & Son ..	£3,748	Johnson & Co.	£3,378
W. Gregar & Son	3,594	E. Lawrance & Sons*.....	3,207
Atherton & Latta	3,450		

* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the boys' and gir's' departments of the Portobello-road School, Notting-hill, by eighty places; and for erecting new water-closets for all departments of the school, for the School Board for London. Mr. T. J. Bailey, Architect :—

Cowley & Drake	£2,868 0 0	F. J. Coxhead	£2,450 14 6
Davis Bros.	2,522 0 0	M. Marsland.....	2,450 0
J. Garrett & Son	2,673 0 0	H. Mallett*	1,981 0
J. Derry	2,574 0 0		

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting the first portion of the school on the Swan-street site, Minories, which will provide accommodation for 347 children, for the School Board for London. Mr. T. J. Bailey, Architect :—

John Grover & Son	£10,250	Atherton & Latta	£9,945
William Downs	10,211	D. Charteris	9,567
Clarke & Bracey	10,116	J. T. Chappell	9,484
John Mowlem & Co.....	10,093	E Lawrance & Sons. 14 and 16, Wharf-road, N.*	9,419
Thomas Boyce	9,970		
Killby & Gayford	9,958		

* Recommended by the Works Committee for acceptance.

LONDON.—For erecting a school-keeper's house and cookery and laundry centres on the site in Charing-cross-road, Soho, for the School Board for London. Mr. T. J. Bailey, Architect :—

Treasure & Son	£3,148	H. Lovatt	£2,612
J. Longley & Co.....	2,904	Stoines & Son	2,579
J. T. Chappell	2,751	Holliday & Greenwood....	2,520
T. Boyce.....	2,698	C. Cox.....	2,515
S. & W. Pattinson	2,693	E. Lawrance & Sons, Wharf-road, N.*	2,452
J. Tverman	2,656		
M. Marsland.....	2,642		

* Recommended by the Works Committee for acceptance.

LONDON.—For refitting the water-closets in connexion with the Hollydale-road school, Nunhead, with stoneware troughs and automatic flushing-tanks, and for providing better ventilation to the offices, &c., for the School Board for London. Mr. T. J. Bailey, Architect :—

J. Garrett & Son.....	£353	L. Whitehead & Co., Clapham-road, S.W.*	£298
J. Smith & Sons.....	349		
J. Marsland.....	335		

* Recommended by the Works Committee for acceptance.

LONDON.—For enlarging the infants department of the Victory-place school, Walworth, by fifty-five places, and for carrying out additions and improvements to the existing school, for the School Board for London. Mr. T. J. Bailey, Architect :—

			A.
Hart Bros.....	£8,434	.....	£150
Holliday & Greenwood	8,320	.....	..
B. E. Nightingale	8,281	.....	180
J. Derry	8,173	.....	..
W. Downs	8,127	.....	170
Holloway Bros.	8,031	.....	190
Lathey Bros.....	7,662	.....	146
J. Smith & Sons	7,645	.....	146
J. Marsland, 1, York-street, Walworth, S.E.*	7,610	.....	190

* Recommended by the Works Committee for acceptance.

A. Deduct, if Keene's cement dado, and distempering be substituted for glazed bricks, as taken.

LONDON.—For the erection of a school on the Sussex-road site, Coldharbour-lane, Brixton, to provide accommodation for 798 children, and also for the erection of a schoolkeeper's house and a cookery centre, for the School Board for London. Mr. T. J. Bailey, Architect :—

			A.
James Longley	£18,961	.....	£823
Thomas Boyce	17,280	.....	915
Lathey Bros.....	16,916	.....	626
Foster & Dicksee	16,895	.....	871
Holliday & Greenwood	16,795	.....	899
John Mowlem & Co.....	16,438	.....	723
Hart Bros.....	16,408	.....	650
E. Lawrance & Sons	16,031	.....	905
William Downs	15,988	.....	600
J. T. Chappell, 149, Lupus-street, Pimlico, S.W.*	15,811	.....	720

* Recommended by the Works Committee for acceptance.

A. Amount included in Tender for supplying glazed brick internal facings.

LONDON.—For the erection of a Model Home at Norwood, for the British Home for Incurables. Mr. Arthur Cawston, architect, 13, Queen Anne's-gate, S.W. :—

	Estimate No. 1.	Estimate No. 2.	Estimate No. 3.
Foster & Dicksee	£21,454	£1,247	£1,984
Deacon & Co.....	20,698	720	1,395
Lorden	20,500	1,180	1,950
Longley	20,470	1,193	1,875
Sanders.....	20,072	1,098	1,761
Charteris.....	19,704	1,143	2,000
Lawrance & Sons	19,684	1,124	1,852

LONDON.—For rebuilding factory at Bermondsey, for Messrs. Shuttleworth & Co. Mr. Arthur Vernon, architect, 29, Cockspur-street, S.W. :—

Cornish & Gaymer	£805	W. Shepherd	£700
W. Brooks.....	800	Houghton & Son.....	632
Bullers	795	C. N. Phillips	593
Batley	734		

LONDON.—Accepted for decorative works, at "Hohenlohe," Chislett-road, West Hampstead, for Mr. S. Flatau :—
Greatorex & Co., Limited £185 0 0

LYTCHETT MINSTER (Dorset).—For alterations and additions to school, for the School Board. Mr. H. F. J. Barnes, architect, Poole :—

Griffin	£588	A. Saunders.....	£353
W. H. C. Curtis	397	G. Baker, Wimborne*.....	335
T. C. Rigler	372		

* Accepted.

NEWPORT (Mon).—For the erection of a Reading Institute at Blaina, near Newport, Mon. Mr. F. R. Bates, architect. Quantities by the architect :—

A. P. Williams	£1,870	D. Davies	£1,635
T. Rees	1,749	C. Lock	1,630
J. Linton	1,740	W. A. Linton	1,610
W. Bagley	1,697	Morgan & Roberts	1,595
George Wilkins	1,695	Henry Parfitt, Pontnewydd Mon.*	1,590
Alfred Hazel.....	1,650		
W. Jones & Son	1,647		

* Accepted.

POOLE.—For rebuilding premises, West Quay-road, Poole, for Messrs. Balston & Co. Mr. H. F. J. Barnes, architect :—

Incas	£1,807 0	W. H. C. Curtis, Market-street, Poole*.....	£1,483 10
Cowlin & Son	1,537 0		
T. C. Rigler.....	1,513 12		

* Accepted.

WANDSWORTH.—For reconstructing a roadway at the Infirmary, St. John's-hill, New Wandsworth, for the Guardians of the Wandsworth and Clapham Union. Mr. T. W. Aldwinckle, architect, 1, Victoria-street, Westminster, S.W. :—

Mowlem & Co.	£654 0	S. Kavanagh	£505 0
Bradshaw & Co.	593 12	J. Bowles	485 0
W. Neave & Son	566 0	Barlow & Roberts	451 0
G. Neal.....	560 0	Woodham & Fry	392 0
W. H. Wheeler.....	556 0		

WANDSWORTH.—For a relief station and residence at Swaffield-road, Garratt-lane, Wandsworth, S.W., for the Guardians of the Wandsworth and Clapham Union. Mr. T. W. Aldwinckle, architect, 1, Victoria-street, Westminster, S.W. Quantities by Mr. Stafford Elsmore :—

H. Brown	£2,124	P. Peters	£1,700
J. Allen & Sons	1,995	J. Garrett & Son.....	1,699
Young & Lonsdale.....	1,887	E. Houghton & Son	1,684
E. Parsons & Co,.....	1,850	W. Hammond	1,664
P. V. Windebank & Co. ..	1,839	Trappitt & Batley	1,580
W. Smith	1,825	W. Wallis	1,560
W. Potterton	1,798	Cowpar	1,525
J. Mills	1,720		

WEST HARTLEPOOL.—For the erection of a block of school buildings, for the School Board. Mr. J. Mitchell Bottomley, architect, 18, Albert-road, Middlesbrough :—

Excavator, Bricklayer, &c.—Bastiman Bros., Middlesbrough	£2,950	0	0
Carpenter and Joiner and Painting.—T. Beetham, West Hartlepool	1,386	0	0
Plumber and Glazier.—L. Robson, West Hartlepool	502	0	0
Plasterer.—H. Tomlinson, Middlesbrough.....	182	10	6
Seating.—J. Howe	115	0	0

WOLVERHAMPTON.—For erecting offices and seed stores, Riches-street, for Mr. T. Bradburn. Mr. Joseph Lavender, architect, Wolverhampton :—

H. Gough	£643 15	B. Guest*	£633 0
G. Cave	640 0		

* Accepted.

[All of Wolverhampton.]

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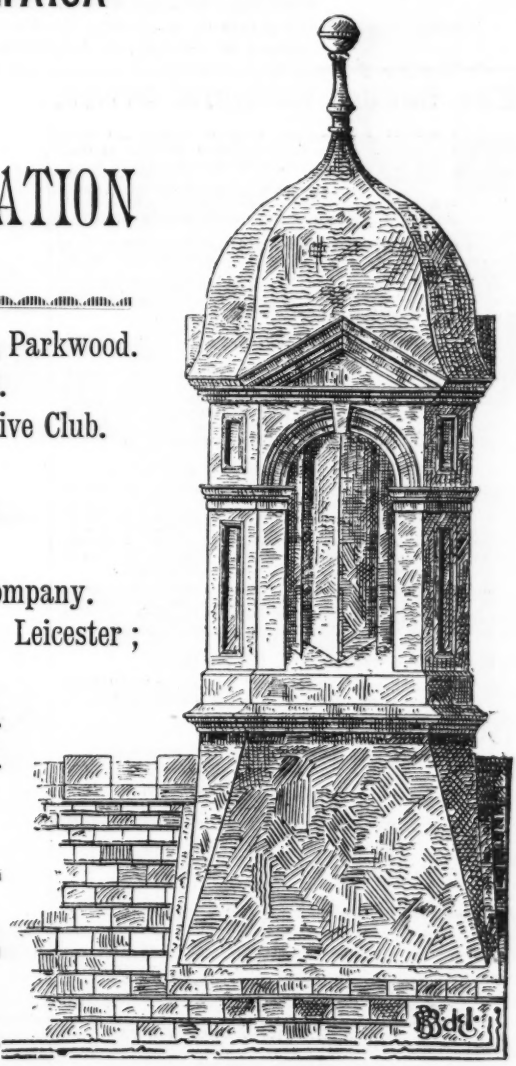

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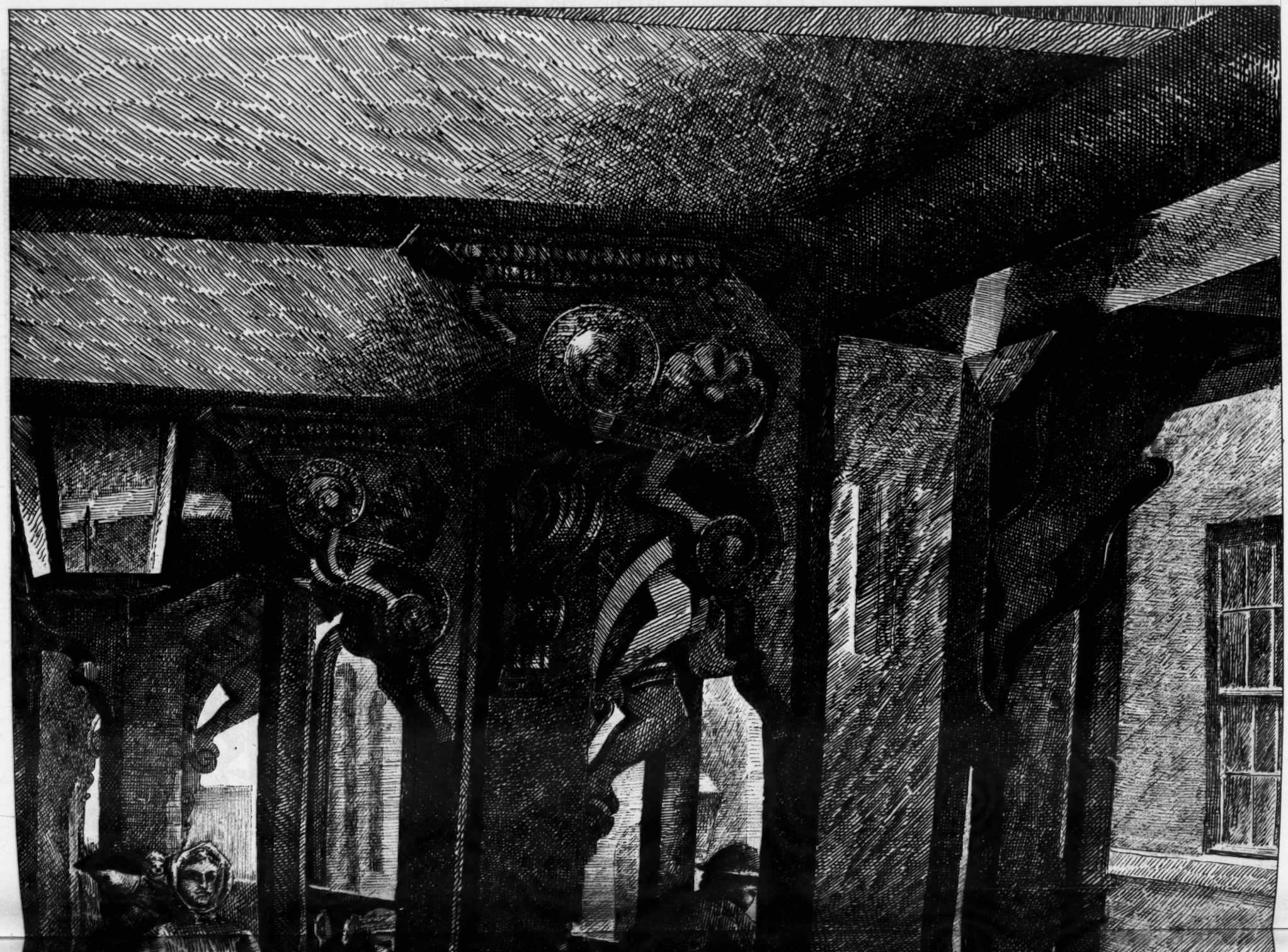

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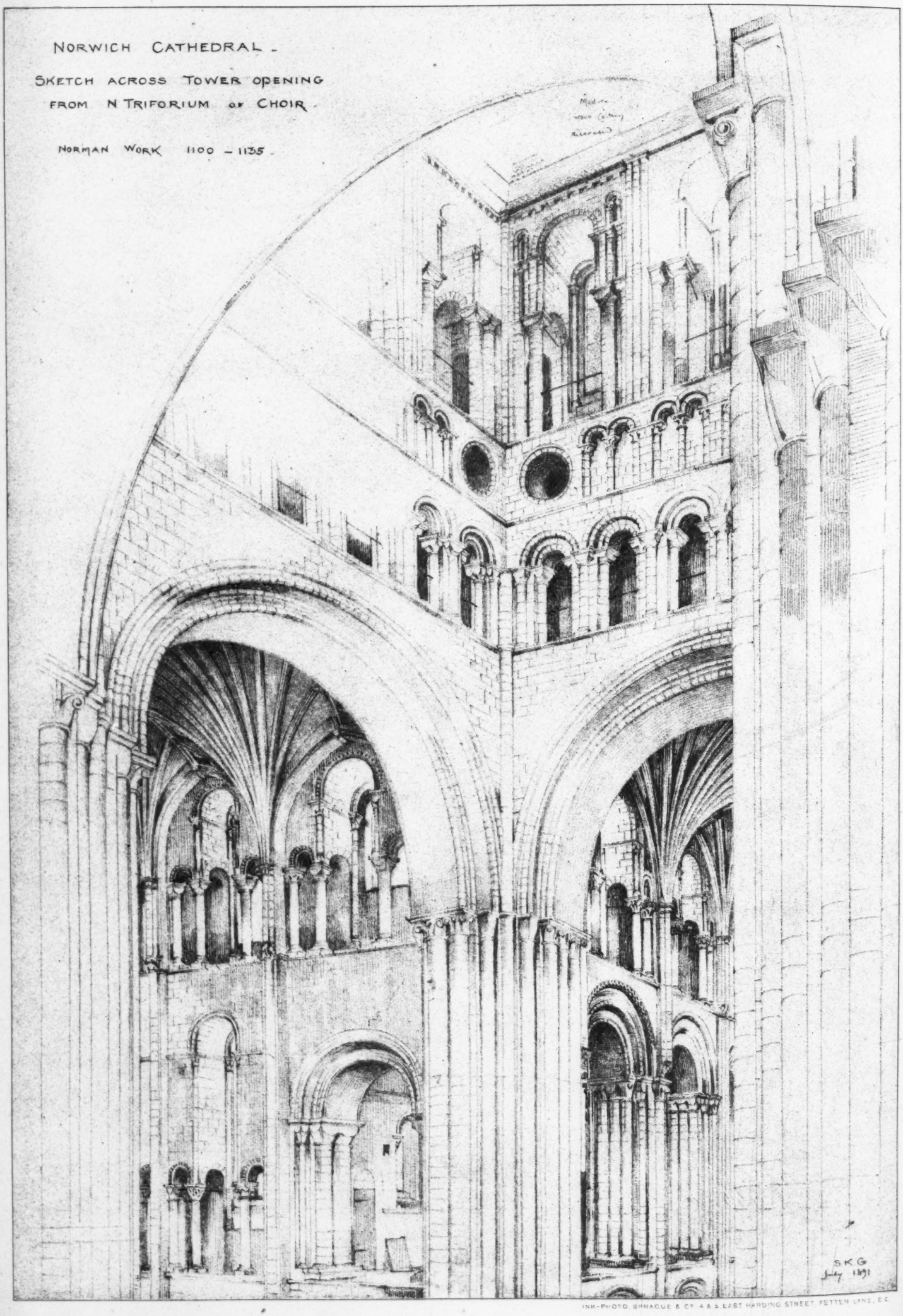

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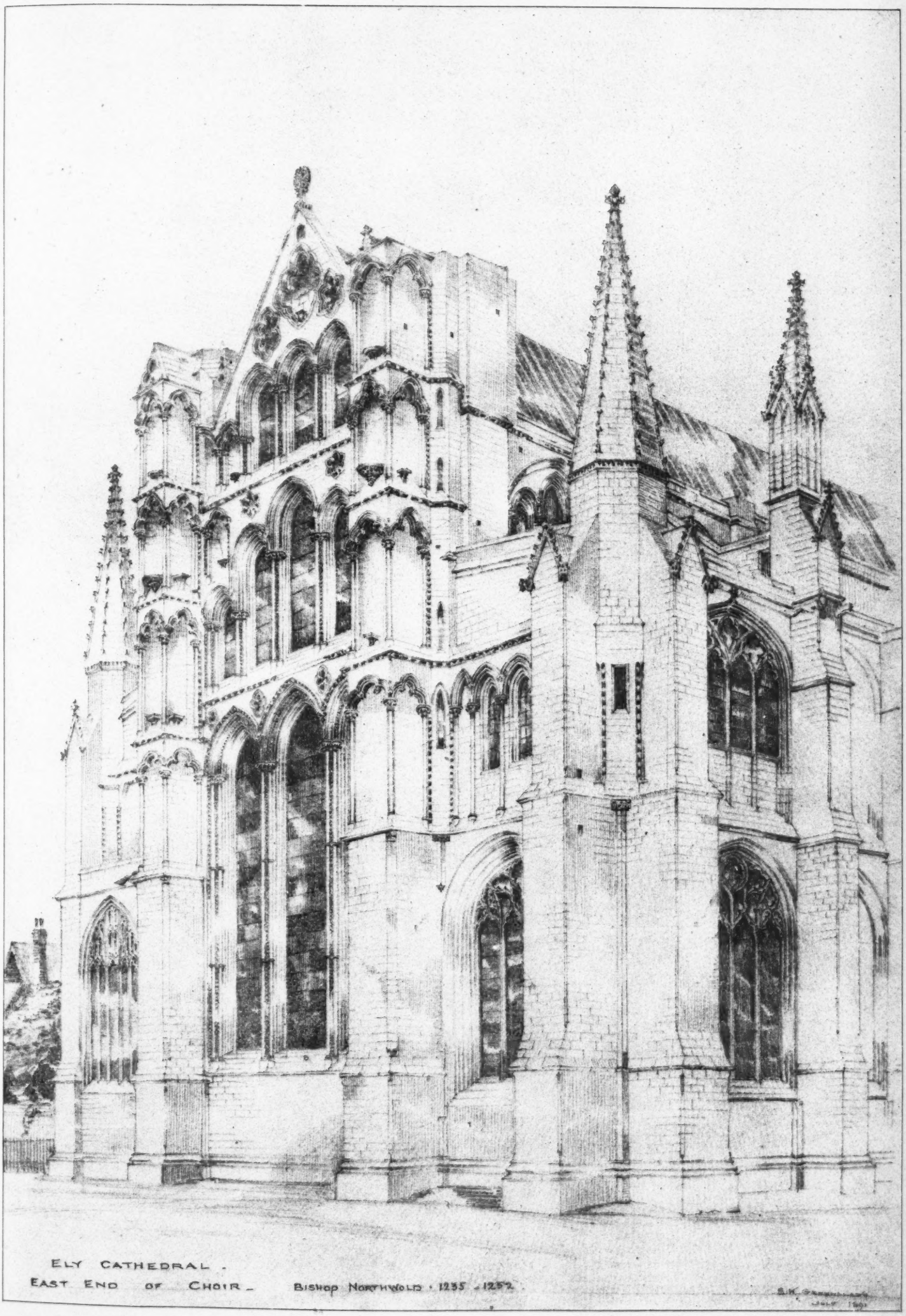

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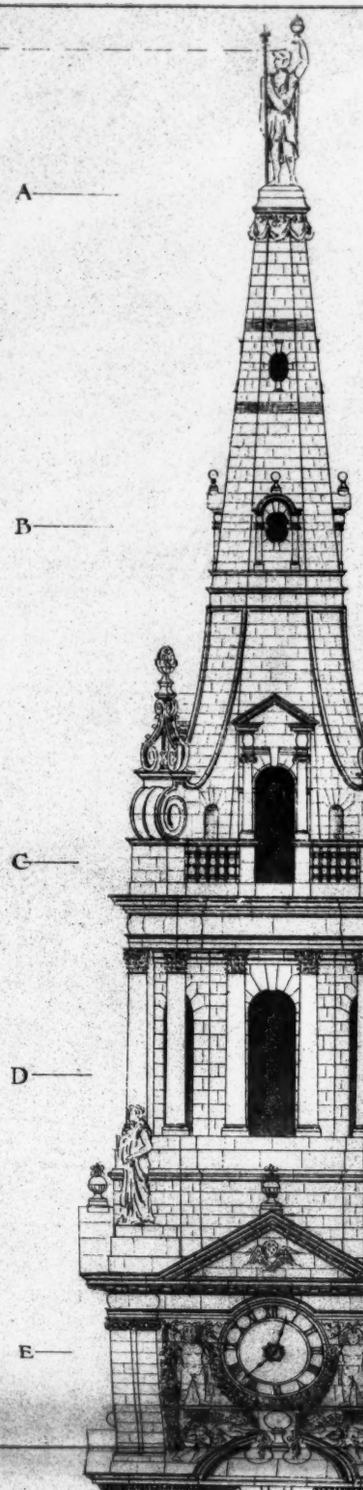
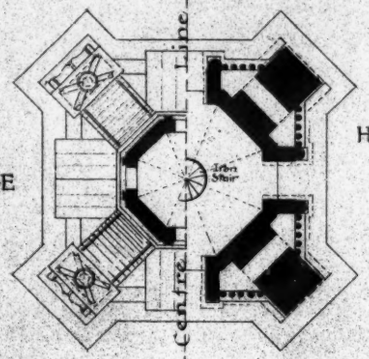
PLANS ELEVATION AND SECTION

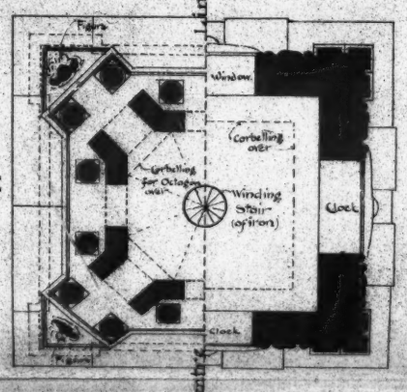


Plan at base of statue A



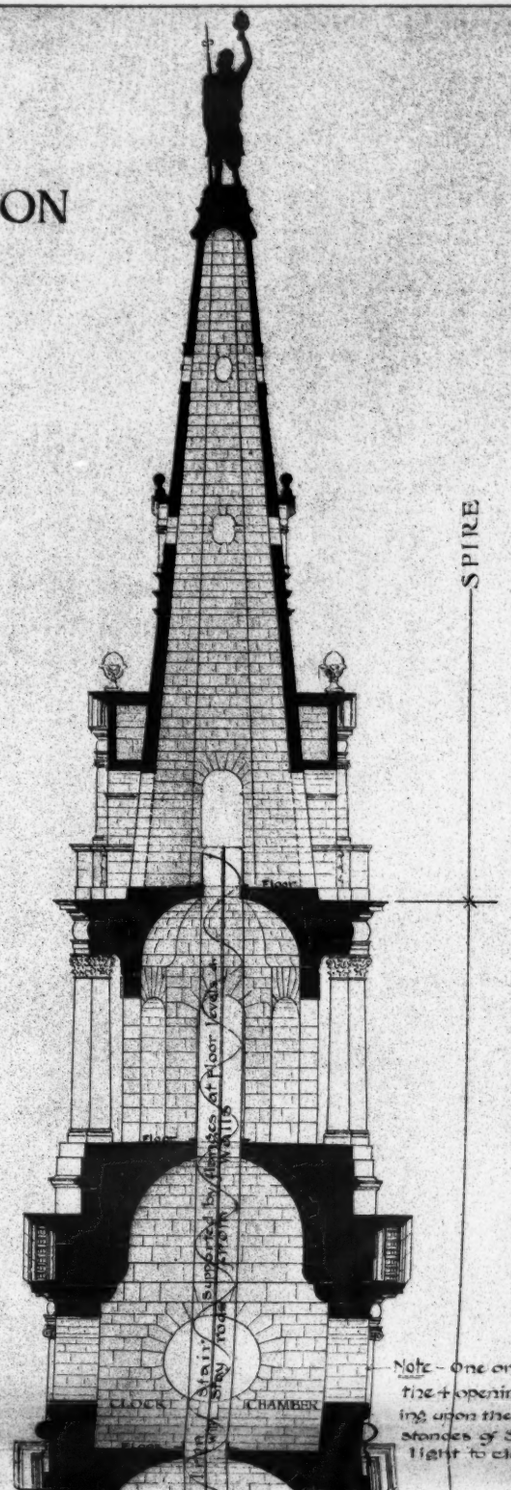
HALF PLAN AT UPPER STAGE OF SPIRE B.

HALF PLAN AT BASE OF SPIRE C.

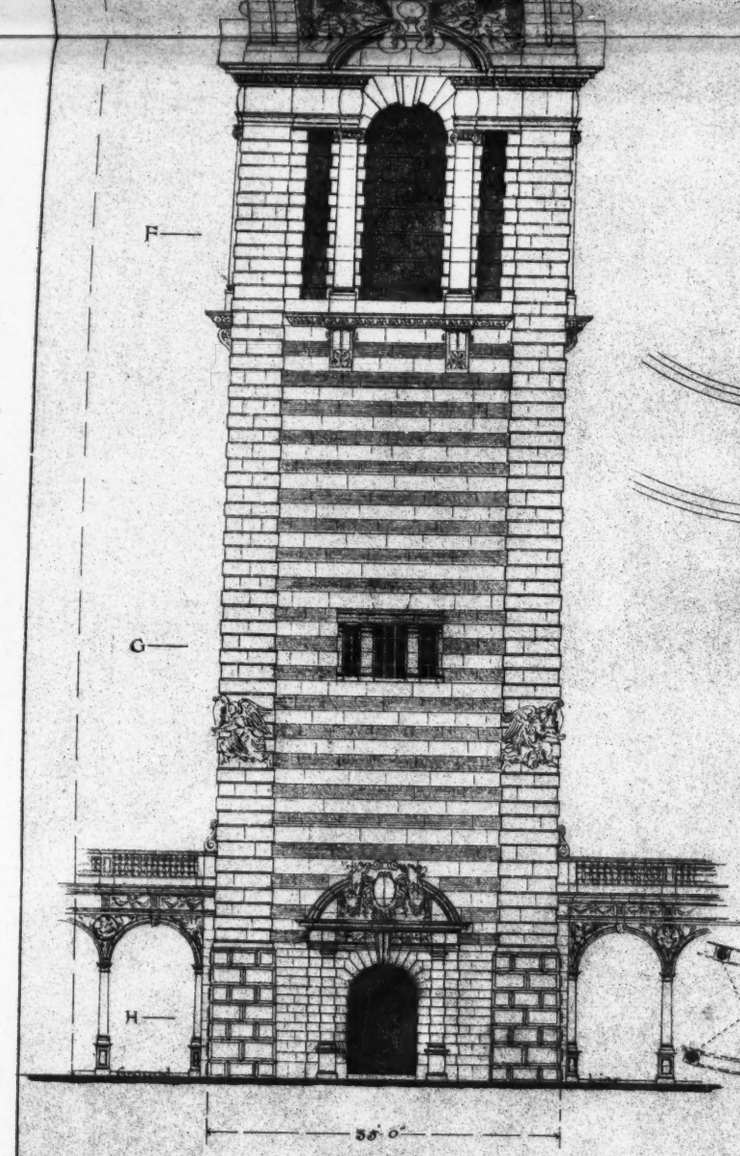


HALF PLAN AT TOP STAGE OF TOWER D.

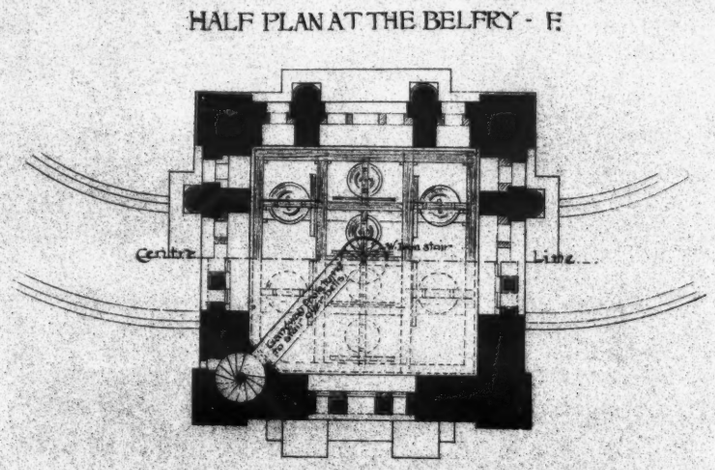
HALF PLAN AT THE CLOCK STAGE E.



Note - One or Two of the 4 openings (depending upon the circumstances of Site) to be light to clock stage



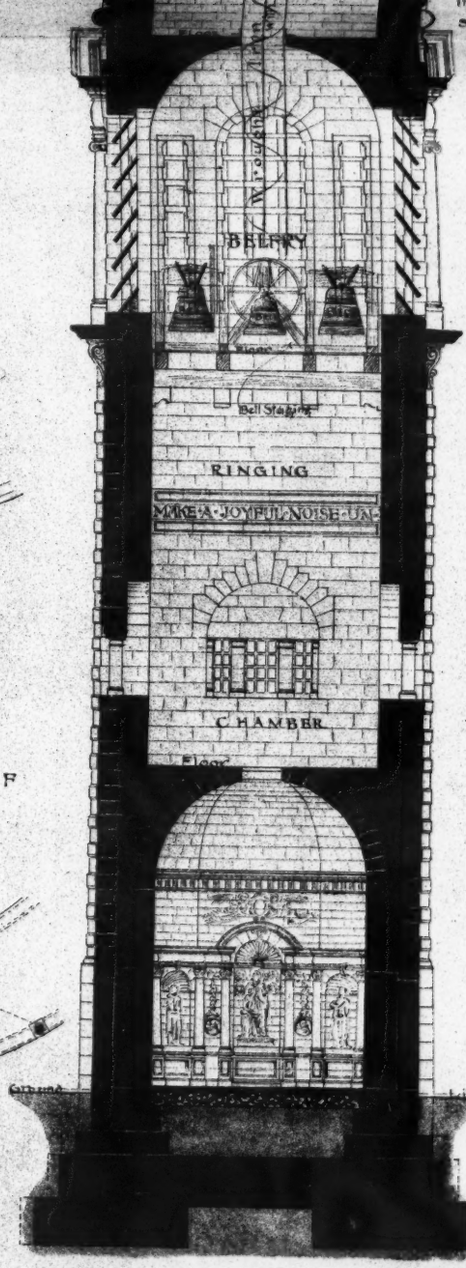
ELEVATION



HALF PLAN AT THE BELFRY - F.

HALF PLAN AT THE RINGING CHAMBER G. — except Gangway which is in the Belfry - F

GROUND PLAN - F



SECTION

0 5 10 20 30 40 50 60 70 80 90 100 feet

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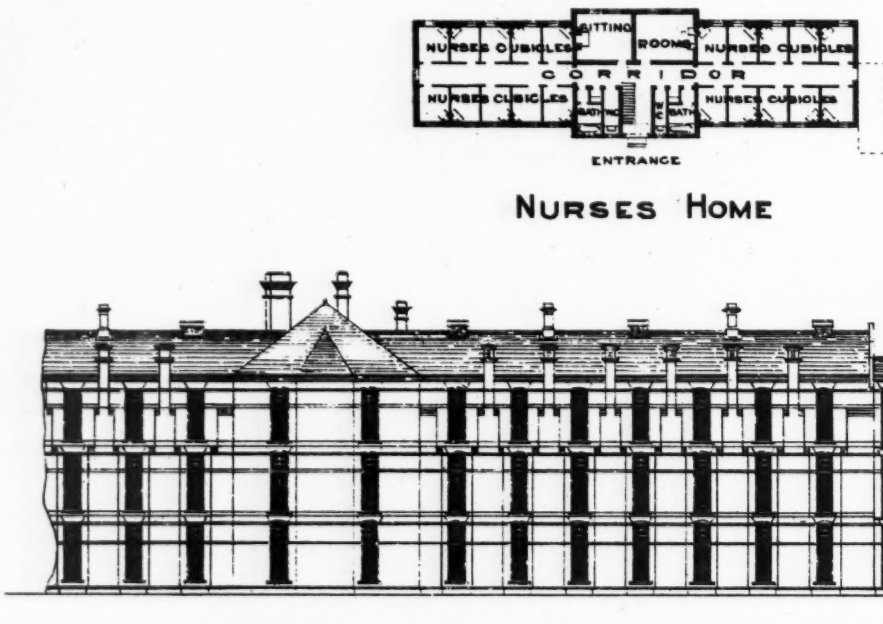
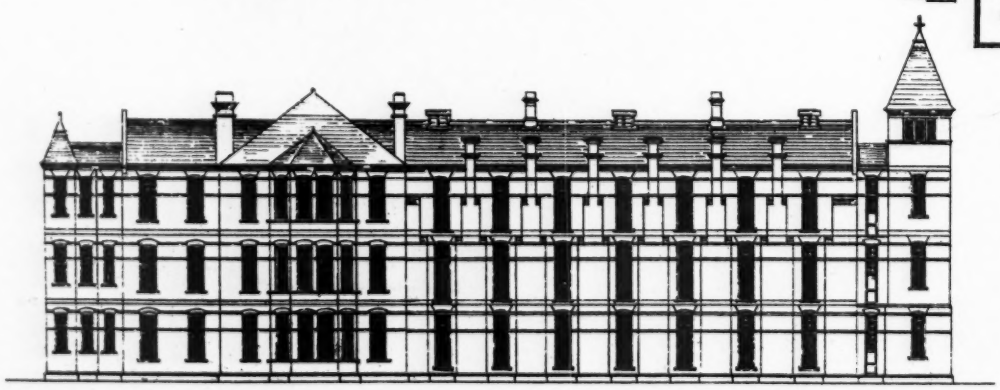
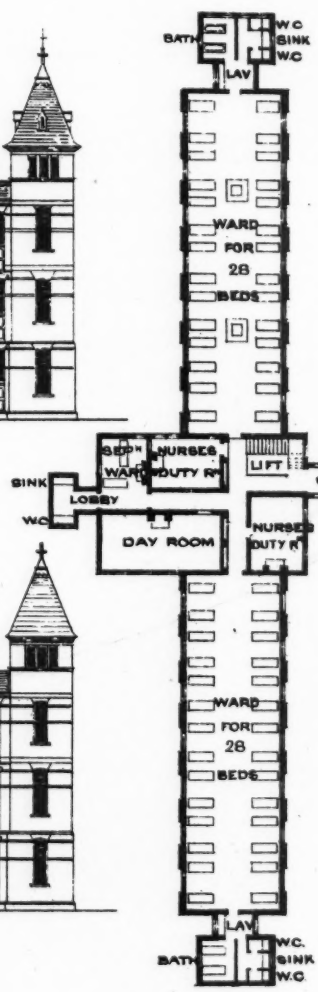


PART ELEVATION OF MALE BLOCK



ELEVATION OF FEMALE BLOCK



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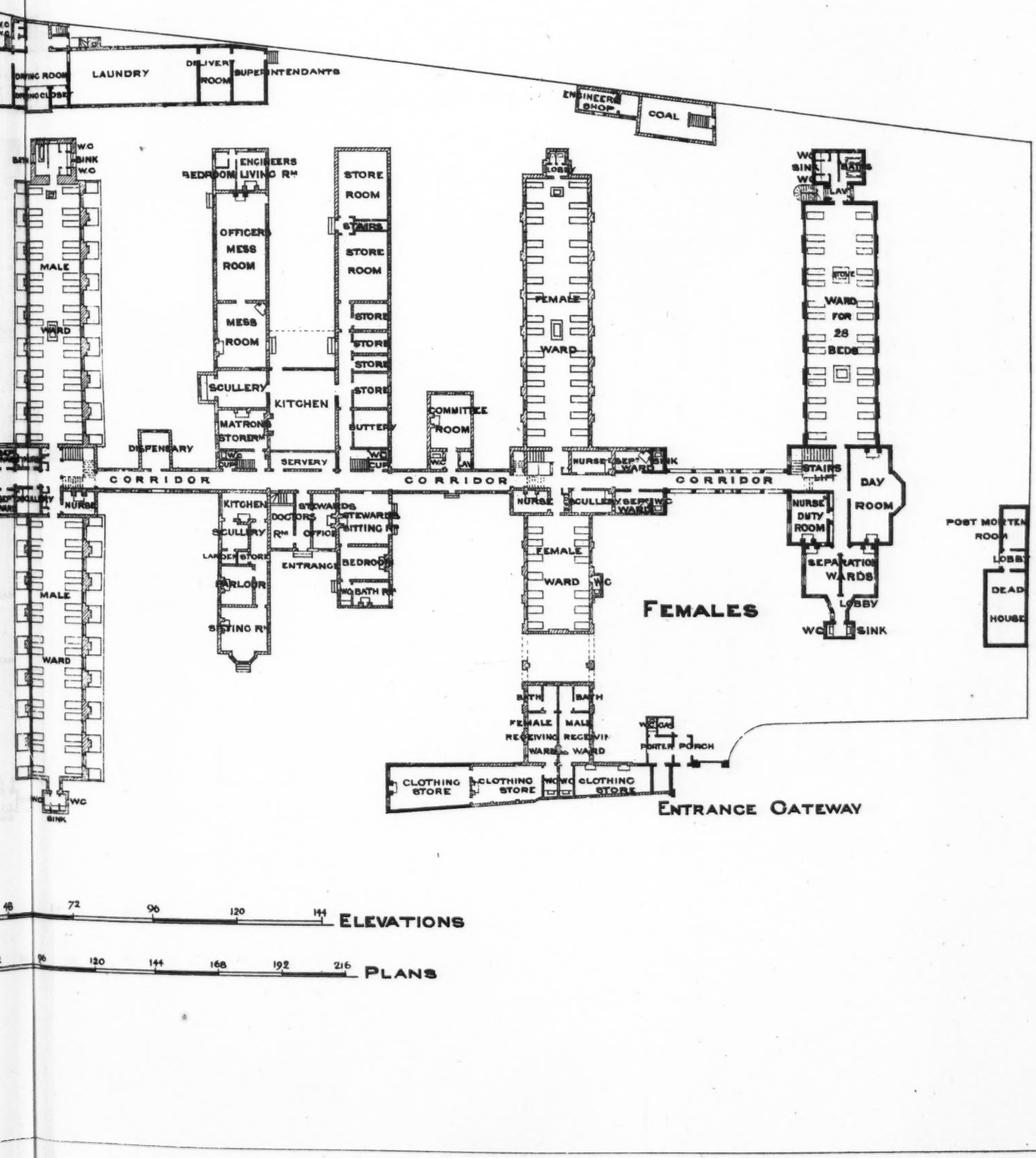

48 72 96 120 144 ELEVATIONS

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